UNITED STATES ARMY
COMMUNICATIONS-ELECTRONICS COMMAND

FORT MONMOUTH, NEW JERSEY

ADVANCE PLANNING BRIEFING FOR INDUSTRY

"MEETING THE ARMY'S POWER NEEDS OF TOMORROW"

SHERATON EATONTOWN HOTEL AND CONFERENCE CENTER

2 JUNE 1993

078

ADVANCE PLANNING BRIEFING FOR INDUSTRY

MEETING THE ARMY'S POWER NEEDS OF TOMORROW

U.S. ARMY
COMMUNICATIONS-ELECTRONICS COMMAND

UNCLASSIFIED

DEPARTMENT OF THE ARMY
HEADQUARTERS, US ARMY COMMUNICATIONS-ELECTRONICS COMMAND
AND FORT MONMOUTH
FORT MONMOUTH, NEW JERSEY 07703-5000

REPLY TO
ATTENTION OF

Office of the Commanding General

Ladies and Gentlemen:

On behalf of the Communications-Electronics Command (CECOM) and the C3I community, I am pleased to present these proceedings of the Advance Planning Briefing for Industry (APBI). This program is designed to enhance the Government-Industry communications network by providing forums for discussions based on the Army's current and future portable power sources needs.

It is imperative that Government and Industry continue working together as a team to provide state-of-the-art portable power sources that will meet the Army's needs and lower operational and support costs. I sincerely hope that this symposium will prove beneficial to Industry in the planning effort required to provide continued support to the soldier in the field.

I welcome your participation in our APBI program.

Sincerely,

Otto J. Guenther

Otto J. Guenther
Major General, U.S. Army
Commanding

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THE OVERALL CLASSIFICATION

OF THIS PUBLICATION IS

UNCLASSIFIED.

ADVANCE PLANNING BRIEFING
FOR INDUSTRY

JUNE 2, 1993

SHERATON EATONTOWN HOTEL AND CONFERENCE CENTER
EATONTOWN, NEW JERSEY

MEETING CHAIRMAN
MR. PATRICK J. WHITFILL
DIRECTOR, SYSTEMS MANAGEMENT

AGENDA

WEDNESDAY, JUNE 2, 1993

0700	REGISTRATION-SHERATON
0815	ADMINISTRATIVE REMARKS Mr. Richard Rizzo Systems Management Directorate, CECOM
0820	WELCOMING REMARKS COL Domenic F. Basile Deputy Commander for Business, CECOM
0840	SESSION I: COMMUNICATIONS-ELECTRONICS BATTERIES FOR THE NINETIES AND BEYOND
	BATTERY PROGRAM GOALS Mr. Patrick J. Whitfill Director, Systems Management, CECOM
	R&D EFFORTS/POTENTIAL CHEMISTRIES Dr. Robert P. Hamlen Electronics and Power Sources Directorate US Army Research Laboratory
	ACQUISITION PHILOSOPHY Mr. Jeffrey Spangher Systems Management Directorate, CECOM
0950	QUESTION AND ANSWER PERIOD
1000	BREAK
1020	SESSION II: REDUCTION OF BATTERY RELATED OPERATING AND SUPPORT COSTS

BATTERY STANDARDIZATION
Mr. Jeffrey Spangher
Systems Management Directorate, CECOM

DOD AVIATION BATTERY SYSTEMS STANDARDIZATION (AVBATTSS)
Mr. Dan Kieffner
Naval Surface Warfare Center, Department of the Navy

STATE OF CHARGE TECHNOLOGY
Mr. Jeffrey Spangher
Systems Management Directorate, CECOM

1120 QUESTION AND ANSWER PERIOD

1130 LUNCH

1245 SESSION II

EPA/DISPOSAL ISSUES
Mr. Christopher Kencik
Safety Office, CECOM

COMMERCIAL BATTERIES
Mr. Richard O. Banyard
Product Integrity and Production Engineering Directorate, CECOM

POWER SUPPLIES AND BATTERY CHARGERS
Mr. Richard O. Banyard
Product Integrity and Production Engineering Directorate, CECOM

1340 QUESTION AND ANSWER PERIOD

1350 BREAK

1410 SESSION III: END ITEM POWER MANAGEMENT

FIELD REALITIES OF BATTERIES
Mr. Douglas A. Antisell
Office of Project Manager, Single Channel Ground and Airborne Radio System (SINCGARS)

END ITEM EQUIPMENT DESIGN REQUIREMENTS
Mr. Perry W. Hugo
Research, Development and Engineering Center, CECOM

POWER SOURCES STATEMENT OF WORK
Mr. Richard O. Banyard
Product Integrity and Production Engineering Directorate, CECOM

1510 QUESTION AND ANSWER PERIOD

1520 SESSION IV: BUSINESS OPPORTUNITIES

BUSINESS OPPORTUNITIES
Dr. Joseph Buccieri
C31 Acquisition Center, CECOM

1540 QUESTION AND ANSWER PERIOD

1600 EXECUTIVE PANEL

Mr. Patrick J. Whitfill
Director, Systems Management
US Army Communications-Electronics Command

Dr. Robert P. Hamlen
Director, Power Sources Division
US Army Research Laboratory

Dr. Joseph Buccieri
Chief, Division B, C31 Acquisition Center
US Army Communications-Electronics Command

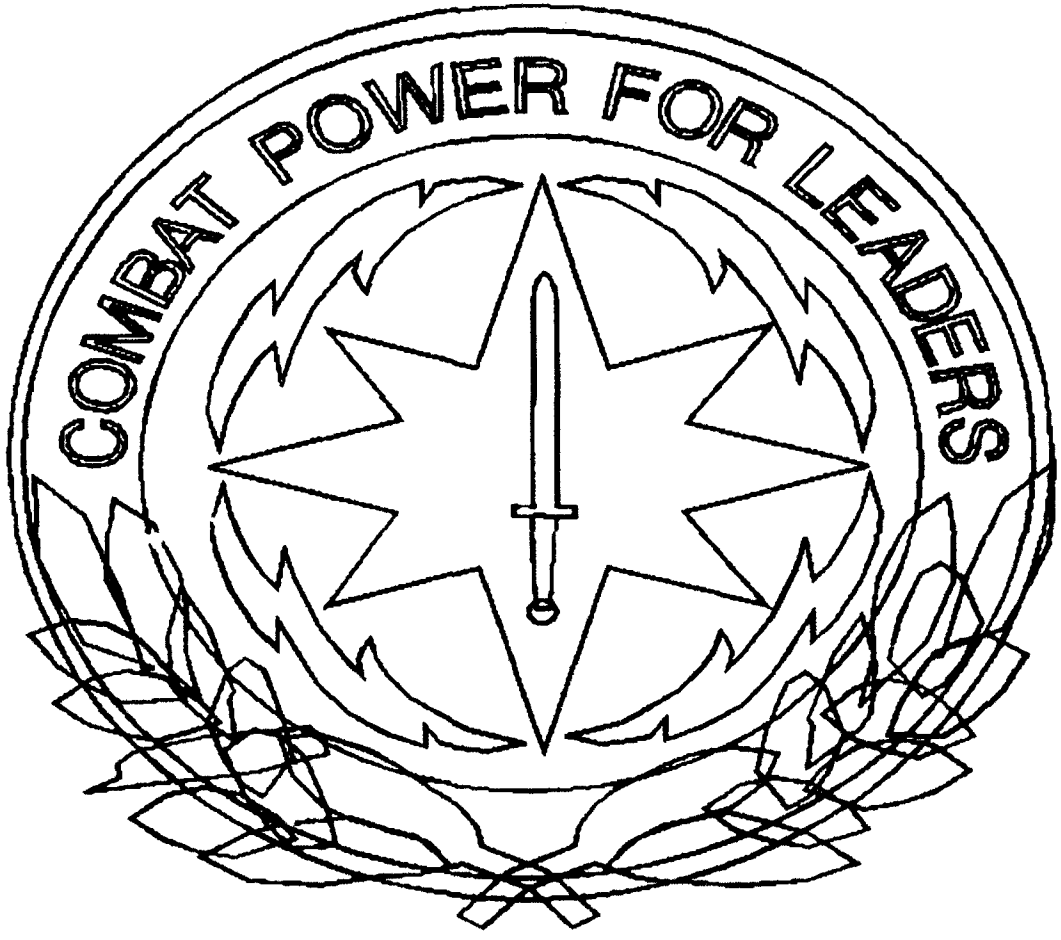
Mr. Richard O. Banyard
Chief, CCS/Avionics Division
Product Integrity and Production Engineering Directorate
US Army Communications-Electronics Command

1630 CLOSING REMARKS
Mr. Patrick J. Whitfill
Director, Systems Management, CECOM

1645 ADJOURN

CONTENTS

WELCOMING REMARKS



COL DOMENIC F. BASILE
DEPUTY COMMANDER FOR BUSINESS, CECOM

COL DOMENIC BASILE
DEP CDR FOR BUSINESS

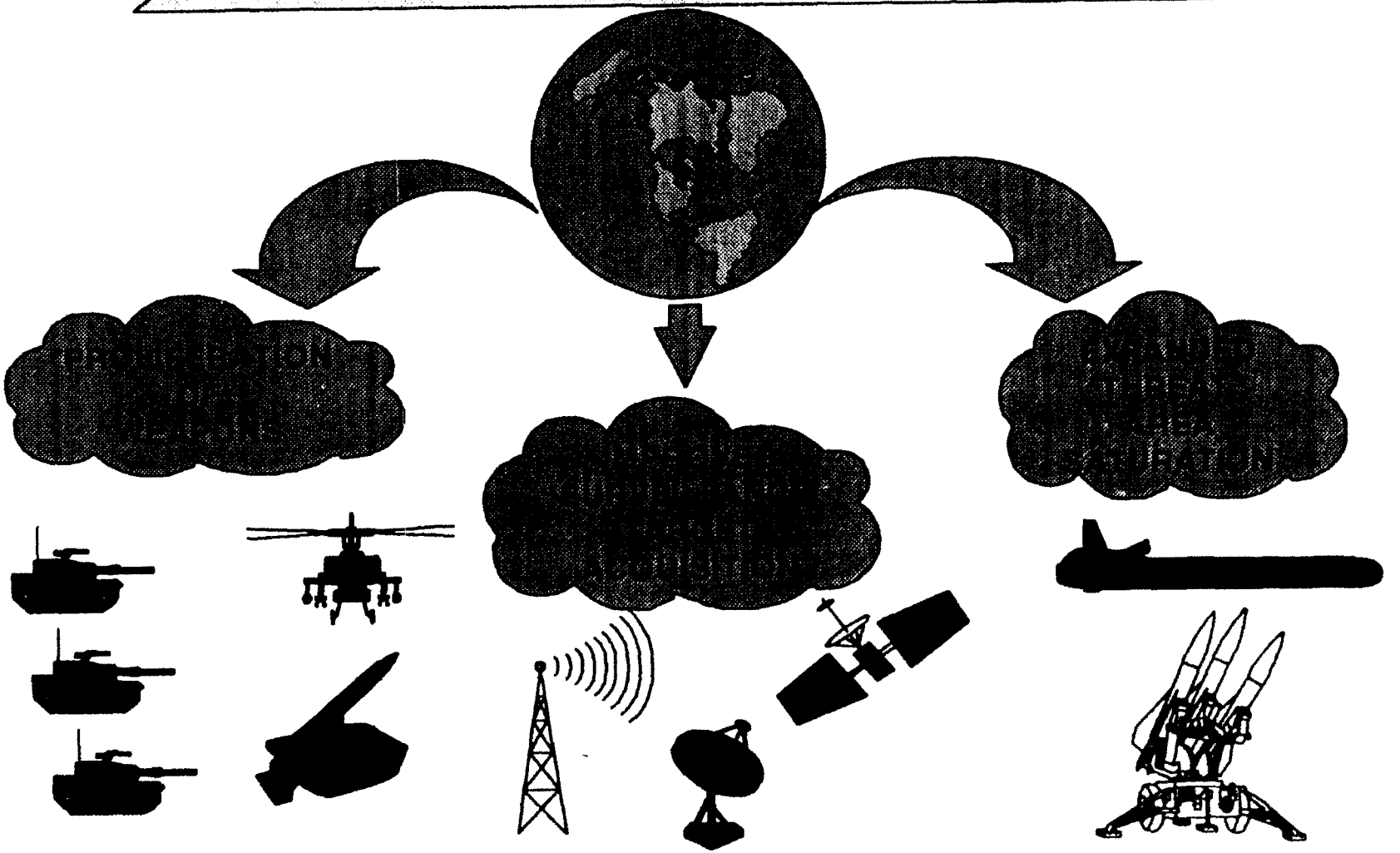
OUTLINE

- BACKGROUND
- HOW WE WILL MEET THE CHALLENGE
- APPLYING NEW IDEAS
- CONCLUSION

OUTCG

BACKGROUND

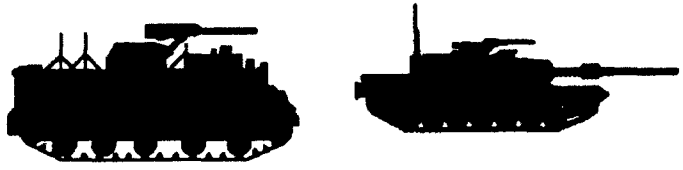
PLANNING FOR THE FUTURE

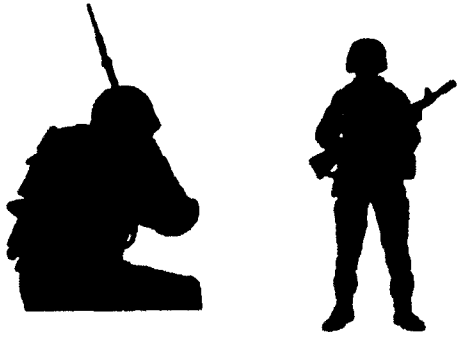


THE WORLD IS MORE: UNPREDICTABLE, UNSTABLE, VOLATILE

BACKGROUND
ARMY MISSIONS

TRADITIONAL:

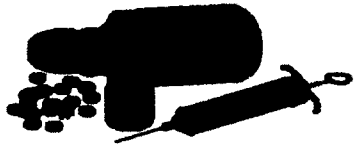




PROMPT & SUSTAINED COMBAT OPERATIONS ON LAND

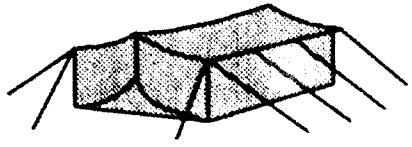
NON-TRADITIONAL:

COUNTER DRUG

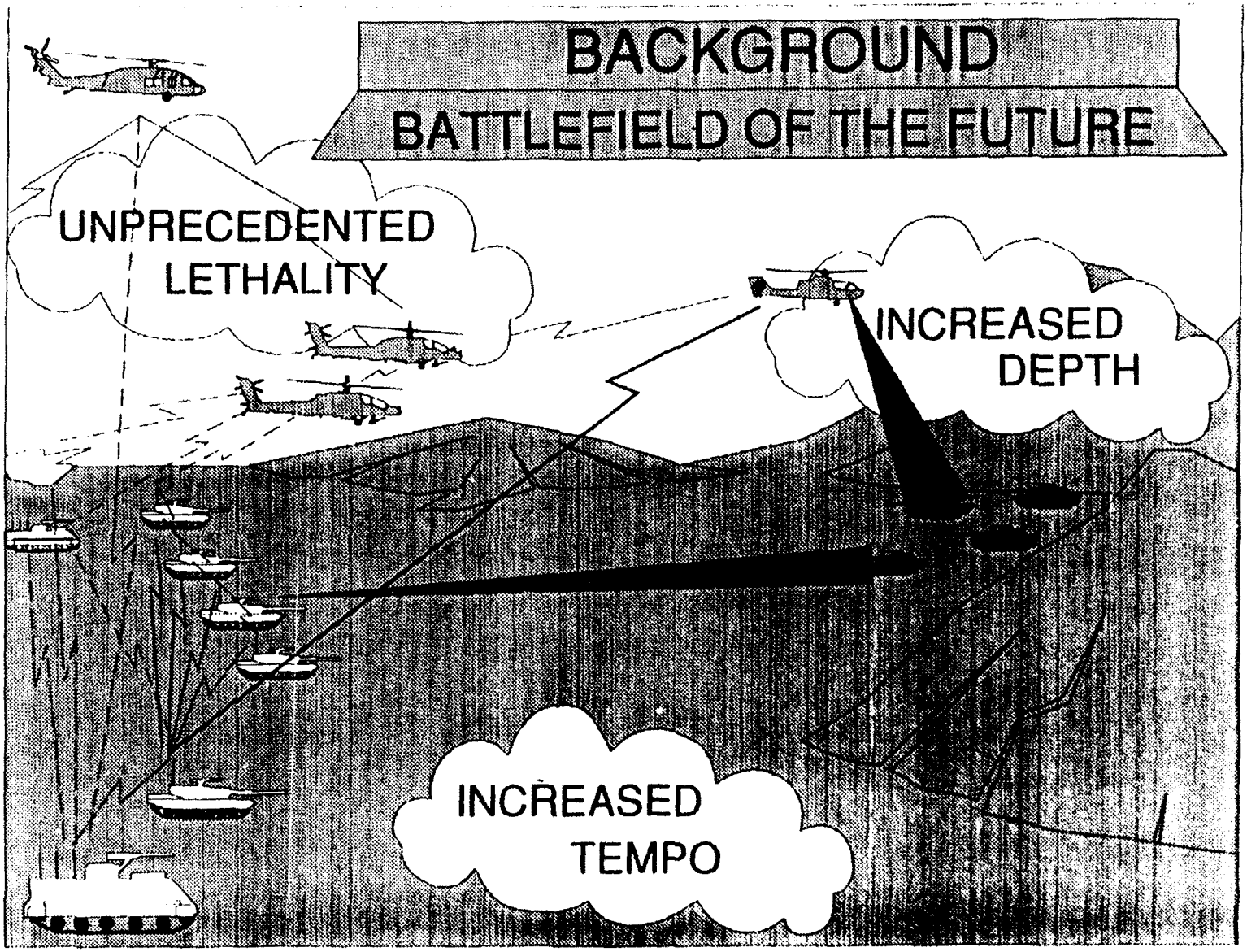


DEMOCRATIC REFORM

DISASTER RELIEF



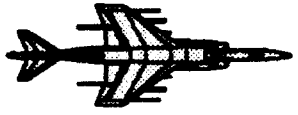
HUMANITARIAN RELIEF


BACKGROUND
BATTLEFIELD OF THE FUTURE
UNPRECEDENTED
LETHALITY
INCREASED
DEPTH
INCREASED
TEMPO

BACKGROUND

ENSURING LAND FORCE DOMINANCE

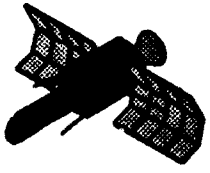
PROJECT AND SUSTAIN THE FORCE

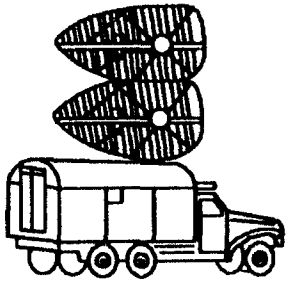


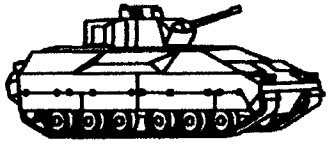
PROTECT THE FORCE

DOMINATE THE MANEUVER BATTLEFIELD

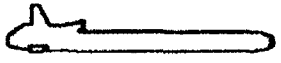
WIN THE INFORMATION WAR







CONDUCT PRECISION STRIKES



ARMY MODERNIZATION OBJECTIVES

BACKGROUND

STRATEGIC VISION

- ARMY STRATEGIC VISION
  - •• TOTAL FORCE TRAINED & READY TO FIGHT
  - •• SERVING THE NATION AT HOME & ABROAD
  - •• STRATEGIC FORCE CAPABLE OF DECISIVE VICTORY

- AMC'S STRATEGIC VISION
  - •• ARMY'S LEADER IN EQUIPPING & SUSTAINING TOTAL FORCE
  - •• SUPERIOR TECHNOLOGY & RESPONSIVE SUPPORT
  - •• WORLDWIDE POWER PROJECTION
  - •• DECISIVE VICTORY

- OUR STRATEGIC VISION
  - •• WORLD CLASS ORGANIZATION OF QUALITY SOLDIERS AND CIVILIANS
  - •• PROVIDING AND SUSTAINING TECHNOLOGICALLY SUPERIOR C3IEW SYSTEMS
  - •• ENABLING THE INTUITIVE COMMANDER TO OWN THE NIGHT, OWN THE SPECTRUM, AND KNOW THE ENEMY

STRAT1

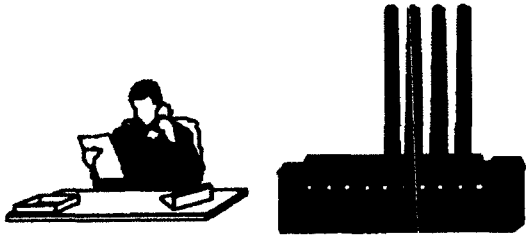
HOW WE WILL MEET THE CHALLENGE
KEY INVESTMENT TENETS FOR THE FUTURE

- MAINTAIN SCIENCE & TECH BASE
- CONDUCT ADVANCED TECHNOLOGY DEMOS
- INSERT ADVANCED TECHNOLOGIES IN EXISTING SYSTEMS
- LIMIT DEMONSTRATION VALIDATION TO PRODUCTION SYSTEMS
- MAINTAIN INDUSTRIAL BASE

HOW WE WILL MEET THE CHALLENGE
SHIFT IN ACQUISITION EMPHASIS

REQUIRES:

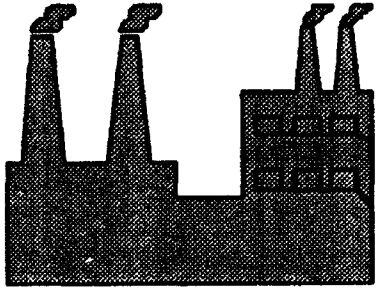
- ACQUISITION EXPERTISE
- BEST VALUE
- CONTRACTOR EVALUATION
- COMMUNICATIONS WITH INDUSTRY
- UNSOLICITED PROPOSAL MGT
- INDUSTRIAL BASE MGT



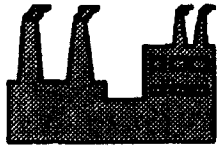
SHIFT

HOW WE WILL MEET THE CHALLENGE
DEFENSE CHANGES AND THE INDUSTRIAL SECTOR

1980s



AVAILABILITY OF DOD UNIQUE SECTORS REDUCED



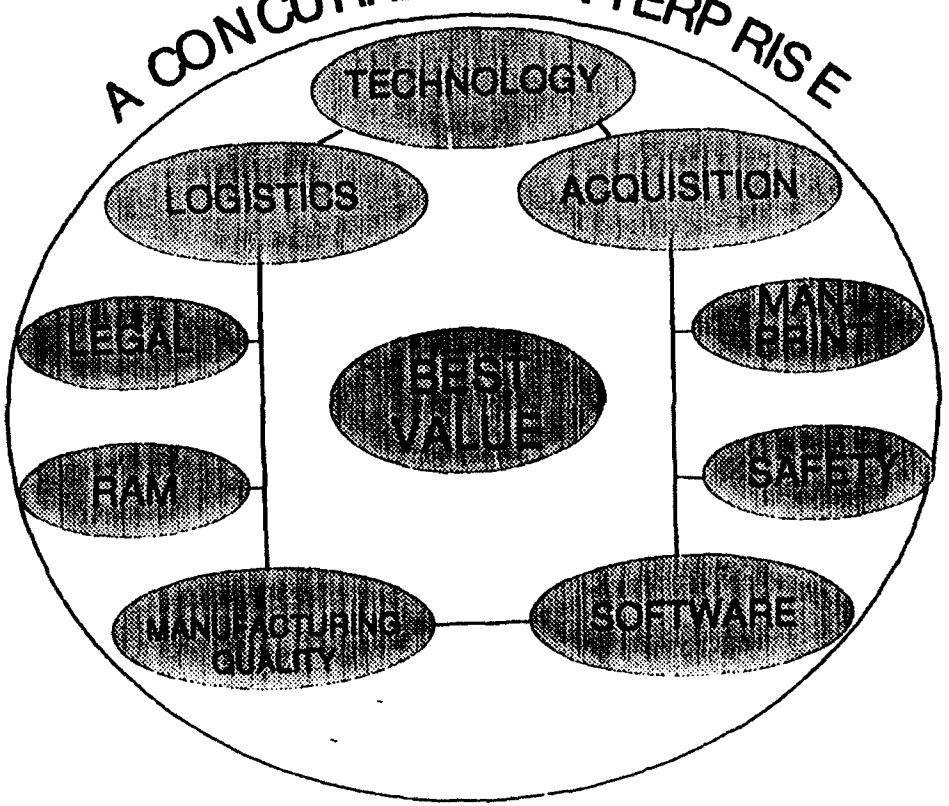
1990s

1990s

- STANDARDIZE TO COMMERCIAL AREAS
- APPLY MILITARY APPLICATIONS TO COMMERCIAL (GPS, BROAD BASED SPECTRUM)
- FOREIGN MILITARY SALES
- REPLACE WITH OTHER TECHNOLOGY (IMAGE INTENSIFICATION TO THERMAL IMAGE)
- PROCURE ACROSS SERVICES (CECOM PROCURES ALL POWER SOURCES)
- OMNIBUS TECHNIQUES
- DUAL PRODUCTION LINES

INDSECT

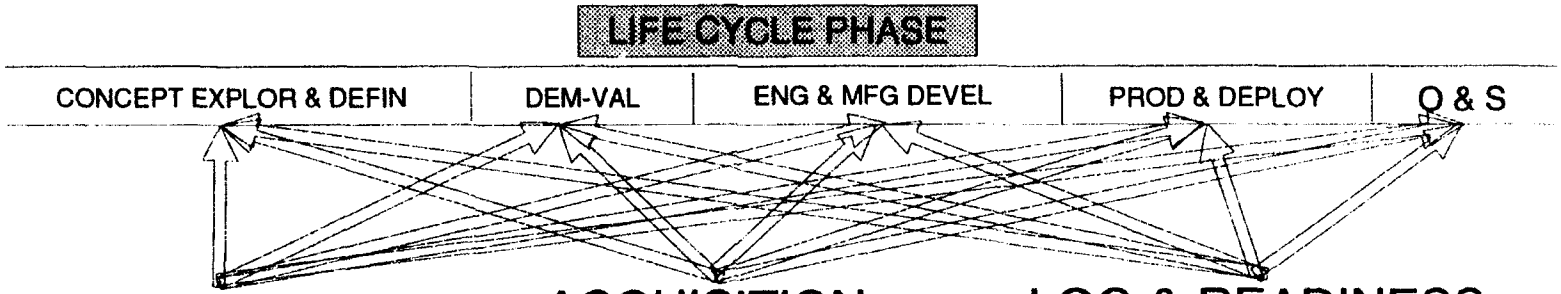
HOW WE WILL MEET THE CHALLENGE
TEAMING



ACQTEAM2

HOW WE WILL MEET THE CHALLENGE

INTEGRATION OF TEAM IN ACQUISITION PROCESS



R & D

- INCREASE/EXPAND CAPABILITIES
- EXTEND LIFE
- REDUCE COSTS
- SIZE REDUCTION
- AUTOMATE TESTING
- MERGING SYSTEMS
- ATD LEVERAGING
- SIMULATION

ACQUISITION

- BEST VALUE
- ACQ STRATEGY
- REDUCING FUNCTIONAL REQUIREMENTS
- AWARD PROCESS
- CUSTOMER/USER FOCUS

LOG & READINESS

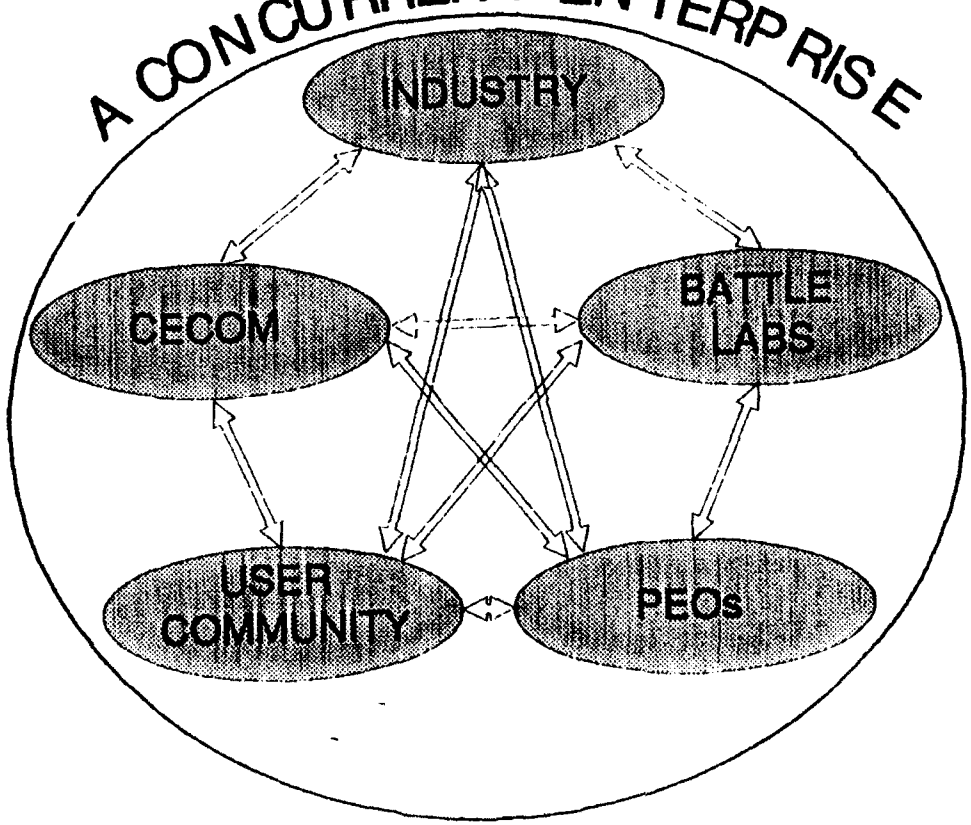
- SUSTAINMENT INTEGRATED INTO REQUIREMENTS
- ARCHITECTURE STANDARDIZATION
- PRODUCIBILITY
- MATERIEL AVAILABILITY
- INDUSTRIAL BASE

PROVIDE SUSTAINABLE, INTEROPERABLE, FLEXIBLE, AND TECHNOLOGICALLY SUPERIOR EQUIPMENT

INTACQTM

HOW WE WILL MEET THE CHALLENGE

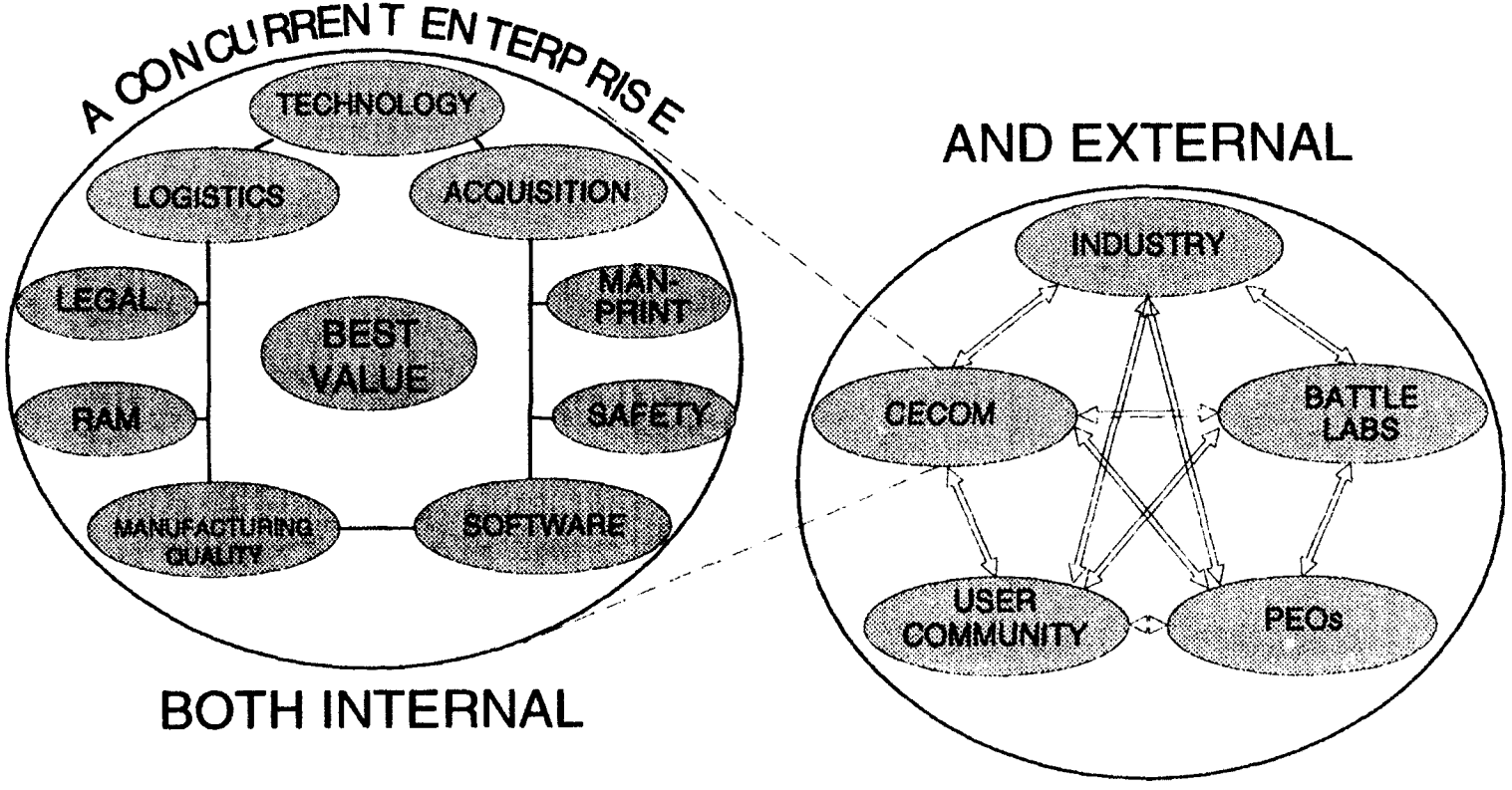
TEAMING



ACQTEAM3

HOW WE WILL MEET THE CHALLENGE

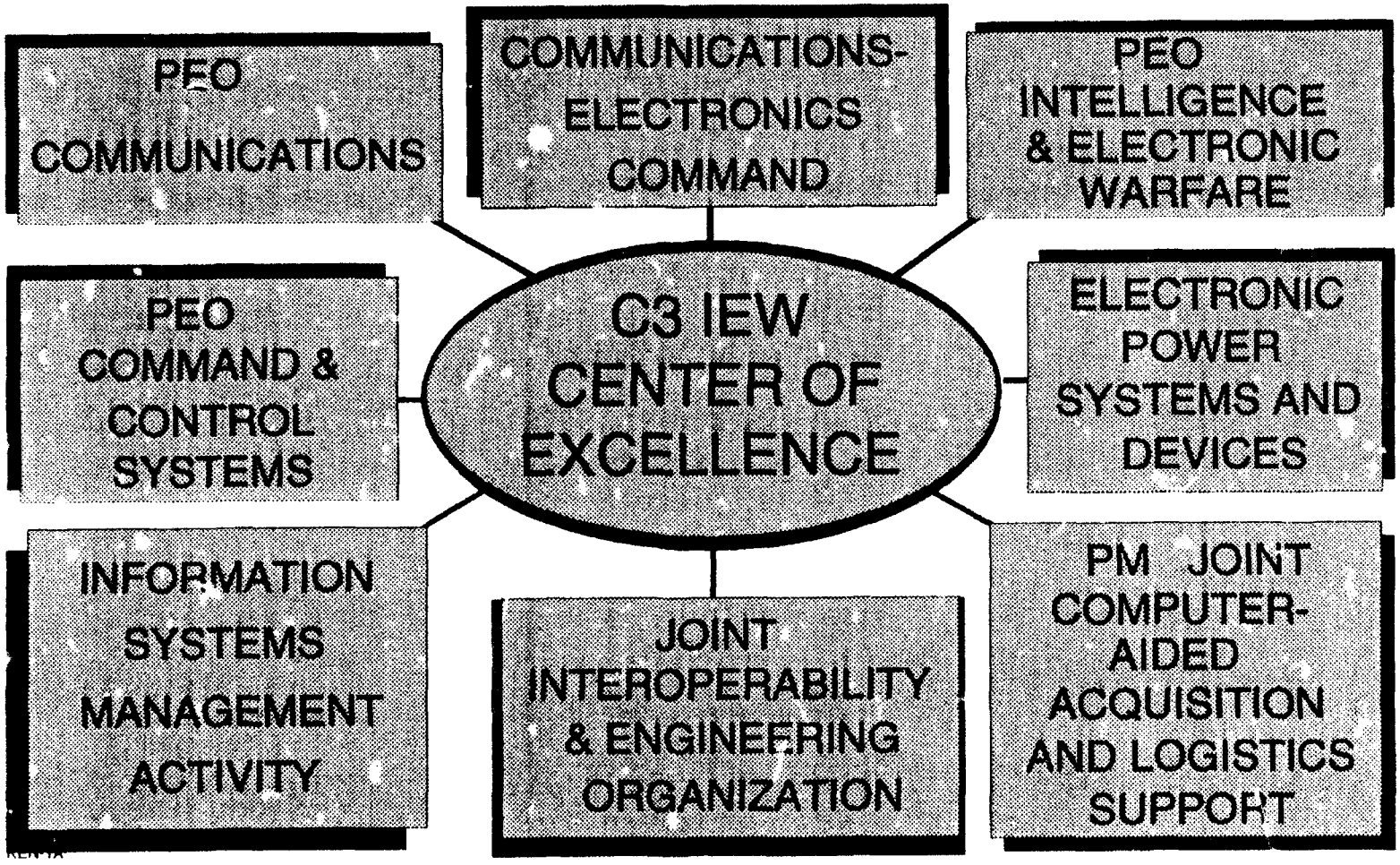
BALANCE AND AFFORDABILITY THROUGH TEAMING



BRINGING TECHNOLOGY RAPIDLY TO THE SOLDIER THROUGH TEAMING

ACQTEAM4

APPLYING NEW IDEAS



APPLYING NEW IDEAS

INDUSTRIAL BASE

- Depots & Arsenals to Commercial?
- Depots & Arsenals Government Operated?
- What's the Role of Small Business?

COMMERCIAL STANDARDS

& PRACTICES

- Commercial Accounting
- Ownership Rights
- Government Audit/Oversight

ENVIRONMENTAL ISSUES

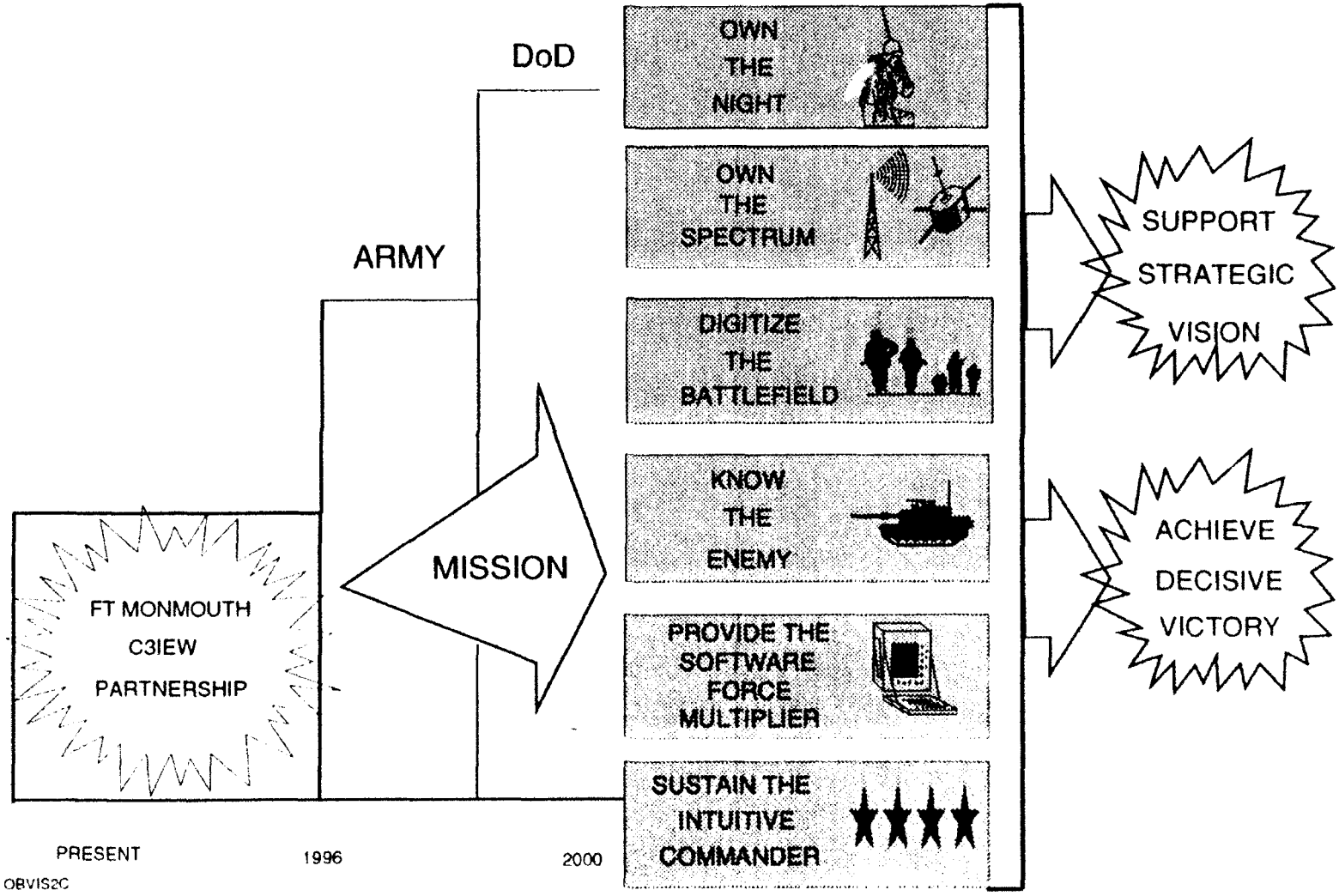
- Evaluation Criteria in Source Selection
- Base Closures Must Address Cleanup Levels

GOVERNMENT ORGANIZATIONS

- Streamling & Consolidate (Defense Contract Management Command)
- "Purple" Organizations

APLNI

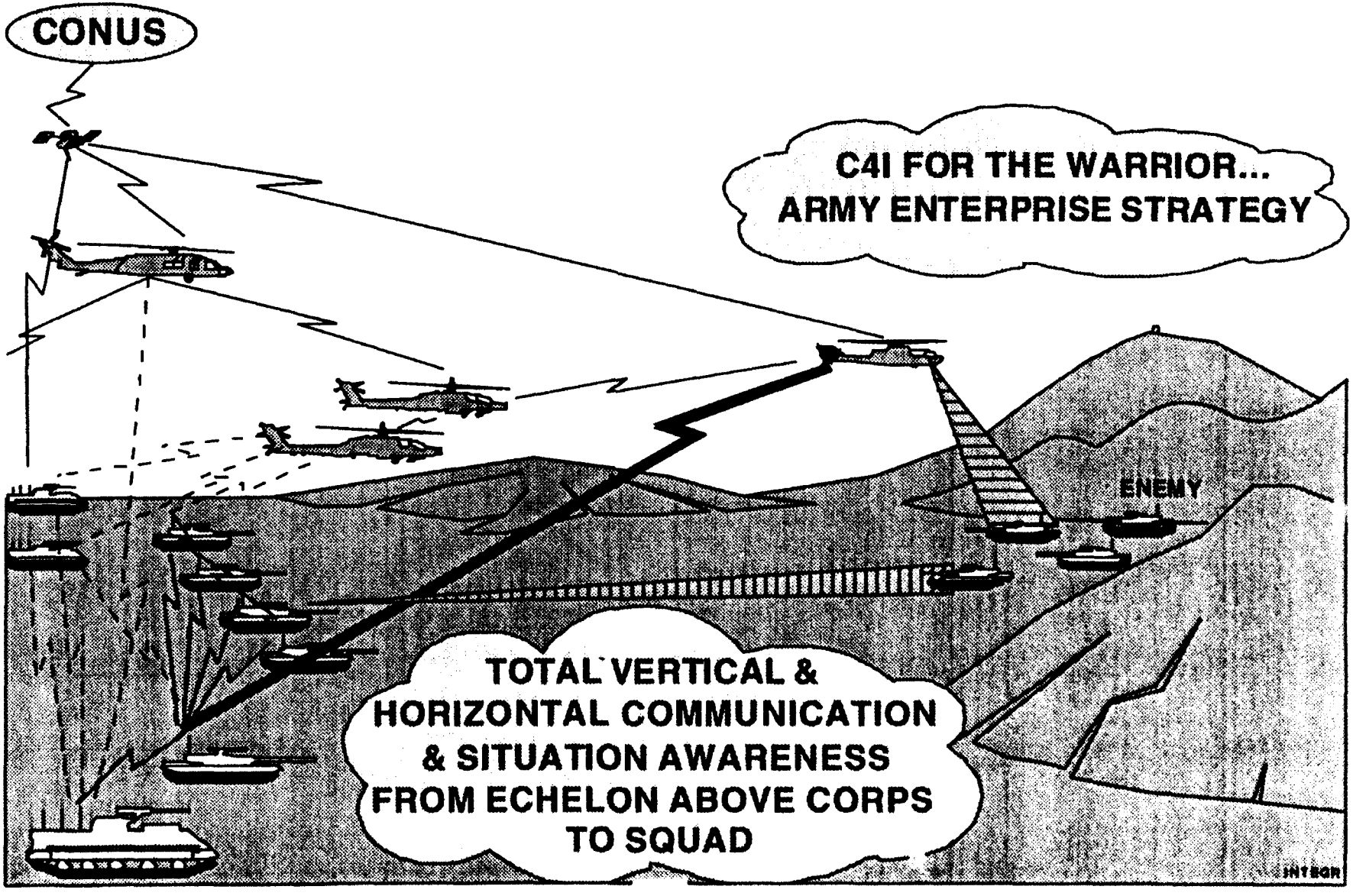
CONCLUSION: WHAT ARE WE TRYING TO ACHIEVE ?



OBVIS2C

CONCLUSION

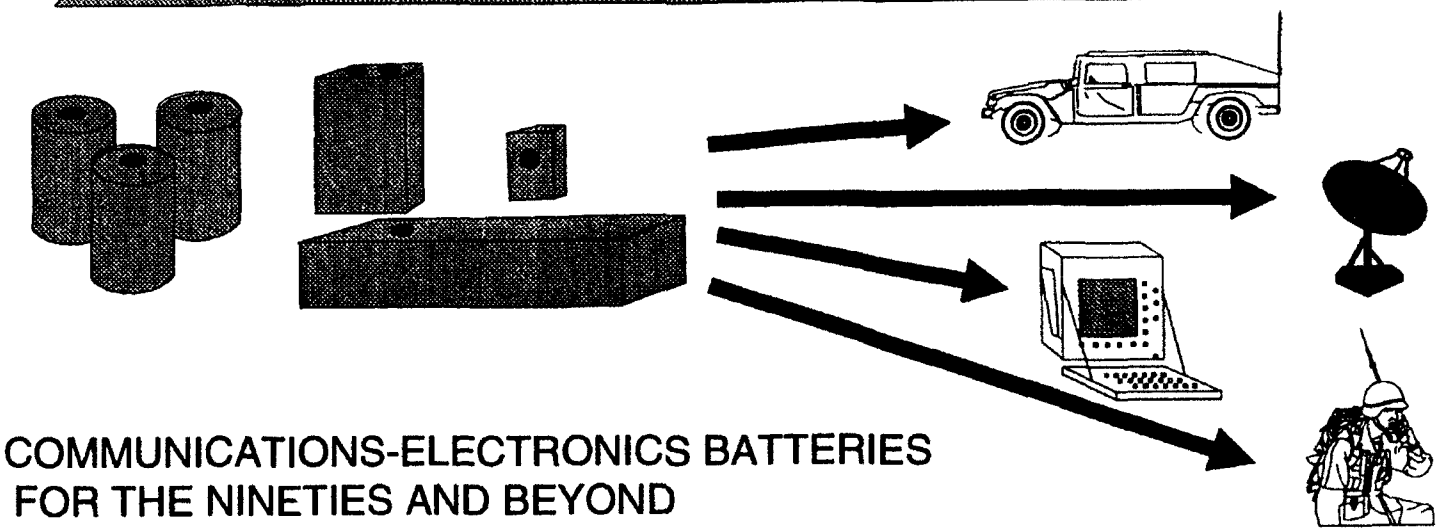
HORIZONTALLY & VERTICALLY INTEGRATE THE BATTLEFIELD



CONCLUSION

BATTERIES - POWERING THE FUTURE

APBI SESSIONS



- COMMUNICATIONS-ELECTRONICS BATTERIES FOR THE NINETIES AND BEYOND

- REDUCTION OF BATTERY RELATED OPERATION AND SUPPORT COSTS

- END ITEM POWER MANAGEMENT

- BUSINESS OPPORTUNITIES

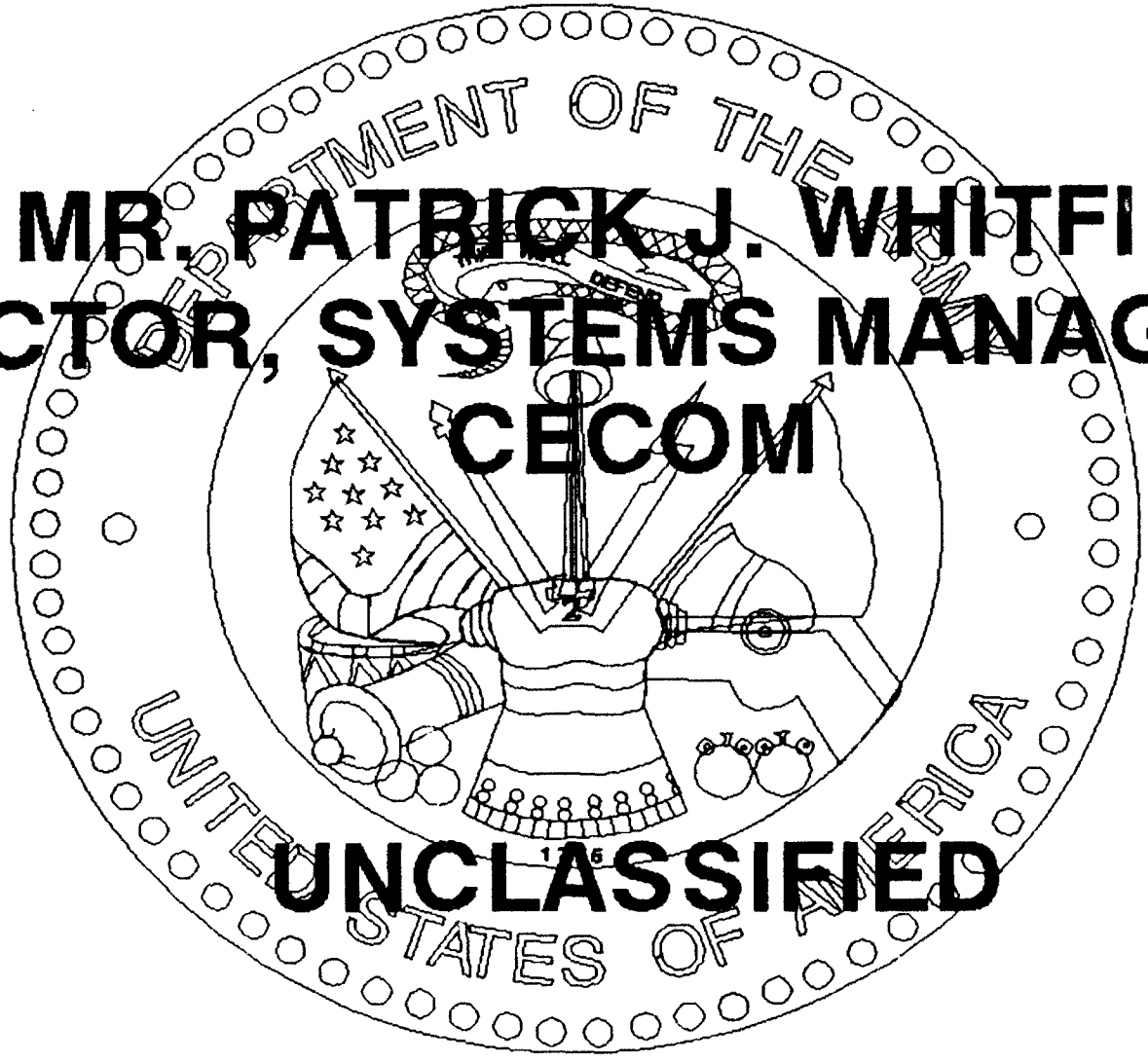
CONBAT

NOTES

SESSION I

COMMUNICATIONS-ELECTRONICS BATTERIES FOR THE NINETIES AND BEYOND

BATTERY PROGRAM GOALS



MR. PATRICK J. WHITFILL
DIRECTOR, SYSTEMS MANAGEMENT
CECOM

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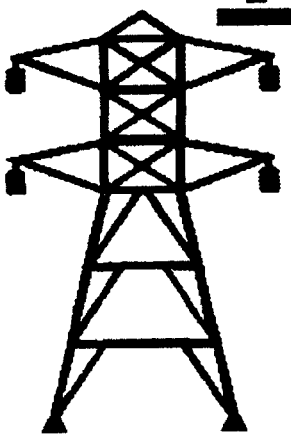
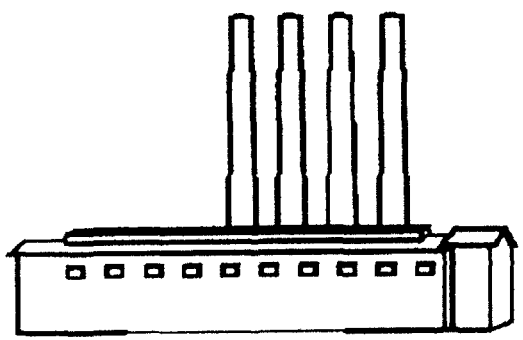
THE CHALLENGE



POWER SOURCE
MASTER PLAN

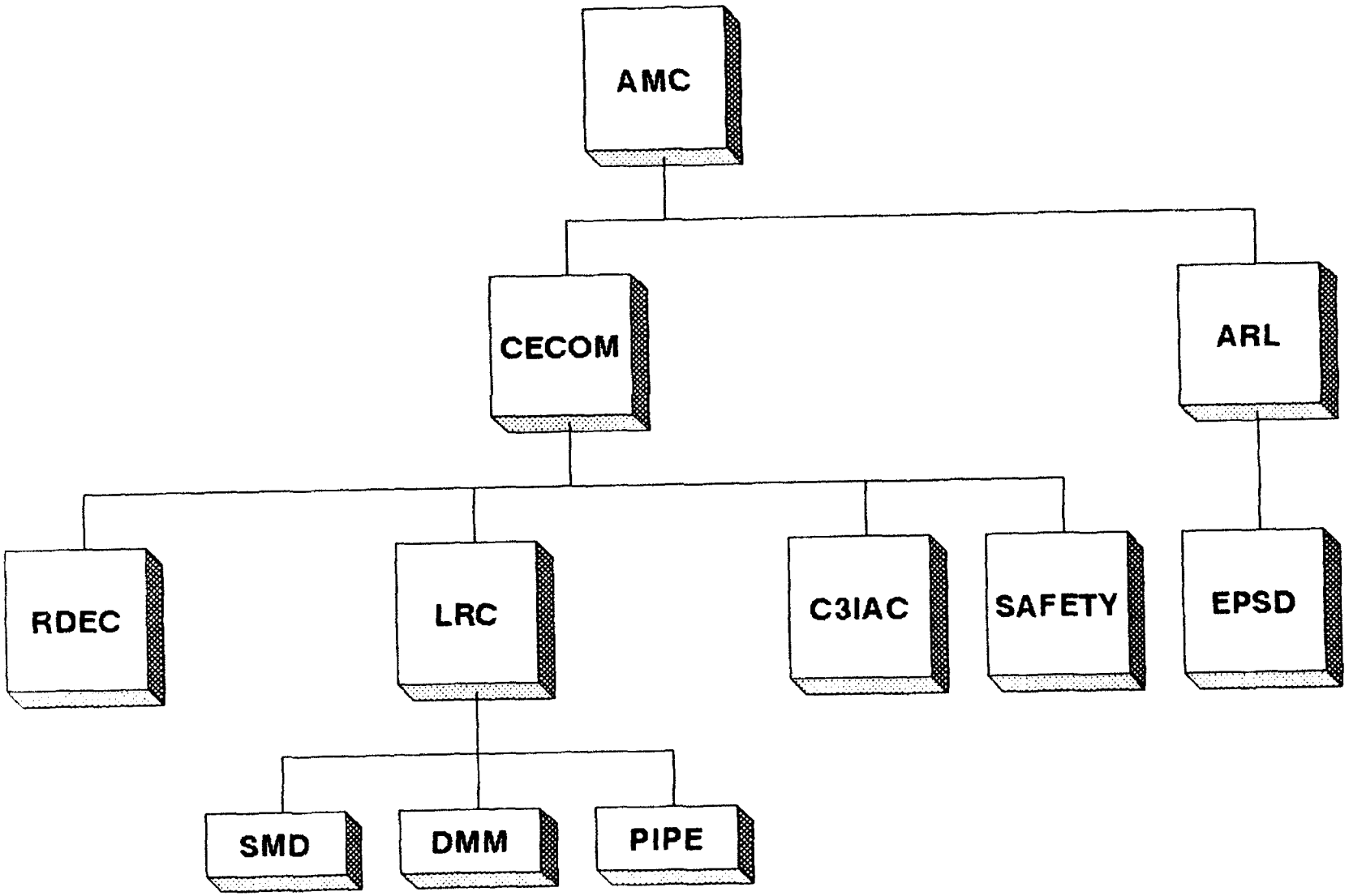
IMPLEMENTATION

POWER
SOURCES
FOR THE
SOLDIER

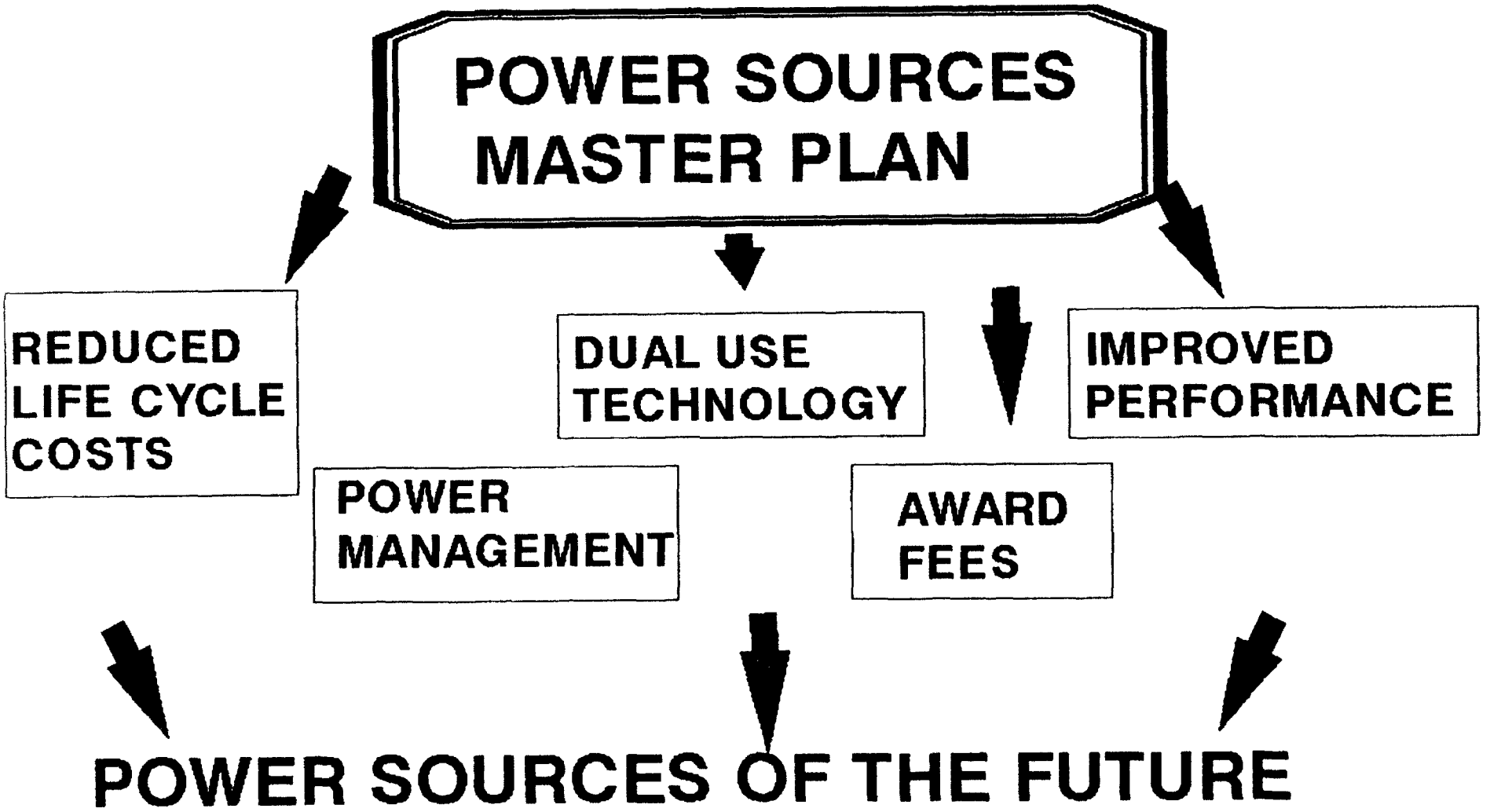


INDUSTRY
INVOLVEMENT

POWER SOURCES TEAM



IMPLEMENTING THE VISION IN A CHANGING WORLD



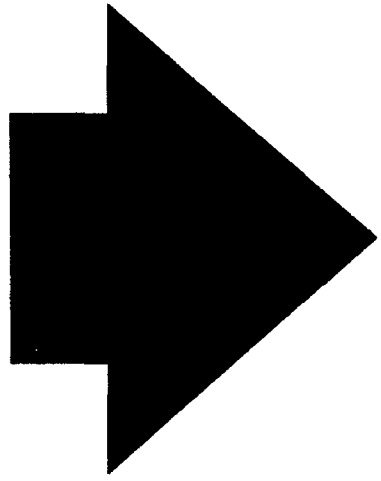
A CHANGING WORLD

1980s	1990s
RISING SALES	DROPPING SALES
MILITARY UNIQUE TECHNOLOGY	DUAL USE TECHNOLOGY
GROWING PRODUCTION BASE	SHRINKING PRODUCTION BASE
INCREASING POWER CONSUMPTION	POWER MANAGEMENT
GROWING BUDGETS	FISCAL CHANGES

OVERALL GOALS

TODAY

- MILITARY UNIQUE TECHNOLOGY
- DEDICATED PRODUCTION BASE
- HIGH O&S COSTS



TOMORROW

1. LOWER O&S COSTS
2. DUAL USE
3. AUTOMATED PRODUCTION
4. STANDARDIZED
5. SAFE
6. NO HARARDOUS MATERIALS

BATTERY STRATEGY

SHORT RANGE GOALS

* LI/SO2
* NICAD
* SLAB

* LI/SO2
* INTERIM RECHARGEABLE

NO ARMY SPONSORED R&D

IMMEDIATE O&S COST REDUCTION

1993 1995 1999 20??

LONG RANGE GOALS

UNIVERSAL BATTERY

DUAL USE, JOINT R&D

* OBJECTIVE BATTERIES

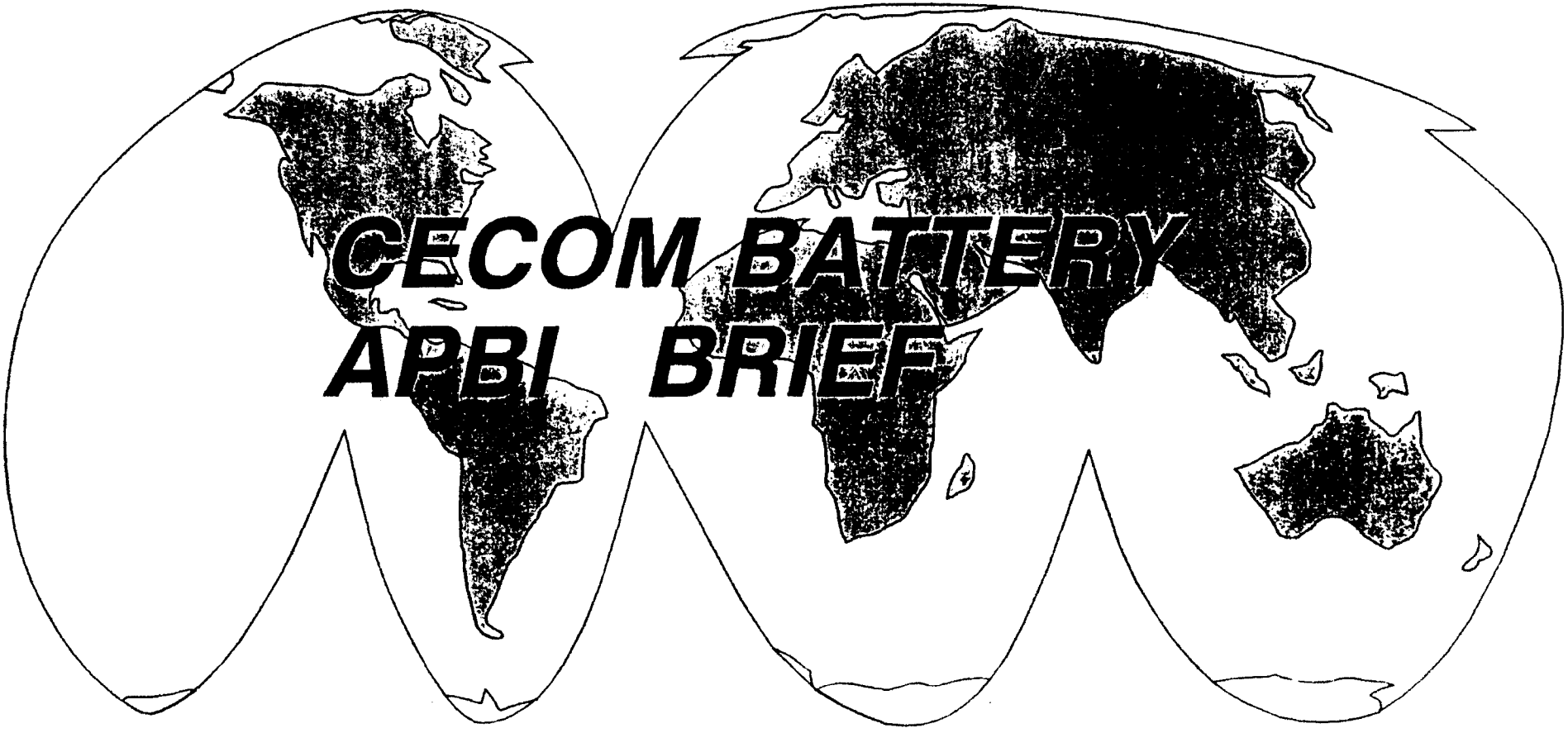
SHORT RANGE GOALS

- REDUCE O&S COSTS
- FIELD INTERIM RECHARGEABLE BATTERY(IES)
- REPLACE MERCURY & ZINC-CARBON BATTERIES
- FIELD "IMPROVED" BATTERY CHARGERS & POWER SUPPLIES
- REDUCE HAZARDOUS WASTE STREAM
- REDUCE DISPOSAL COSTS
- REPLACE VENTED NICAD AIRCRAFT BATTERIES

LONG RANGE GOALS

- REDUCE O&S COSTS
- FIELD OBJECTIVE FAMILY OF
  - PRIMARY BATTERIES
  - RECHARGEABLE BATTERIES
  - AIRCRAFT BATTERIES
- FIELD A UNIVERSAL BATTERY CHARGER
- MINIMIZE PROLIFERATION
- CONTINUE DEVELOPMENT OF "UNIVERSAL" BATTERY
- ELIMINATE HAZARDOUS WASTE
- STATE OF CHARGE INTERNAL TO END ITEM

NOTES



CECOM BATTERY APBI BRIEF

DR. ROBERT P. HAMLEN
ARMY RESEARCH LABORATORY
FT MONMOUTH, NEW JERSEY

AGENDA

US ARMY RESEARCH LABORATORY

ELECTRONICS and POWER SOURCES

- BACKGROUND ON POWER TRENDS AND POWER MANAGEMENT
- ADVANCES IN:
  - PRIMARY BATTERIES
  - RECHARGEABLE BATTERIES
  - RESERVE POWER SUPPLIES
  - PULSE POWER BATTERIES/CAPACITORS
  - FUEL CELLS
  - THERMOPHOTOVOLTAIC
- FUTURE PROGRAMS

POWER SOURCES PROGRAMS

US ARMY RESEARCH LABORATORY

ELECTRONICS and POWER SOURCES

PRIMARY BATTERIES

- High Energy Density
- Low Cost

RECHARGEABLE BATTERIES

- Improve Energy Density
- Low Cost

RESERVE BATTERIES

- Lithium Based
- Longer Operating Life

PULSE POWER BATTERIES AND CAPACITORS FOR ELECTRIC WEAPONS

- Very High Discharge Rates
- Long Cycle Life

FUEL CELLS

- Compact and Portable
  - Soldier System
- Silent Diesel Operation
  - Tank Silent Watch
  - Field Power Generation

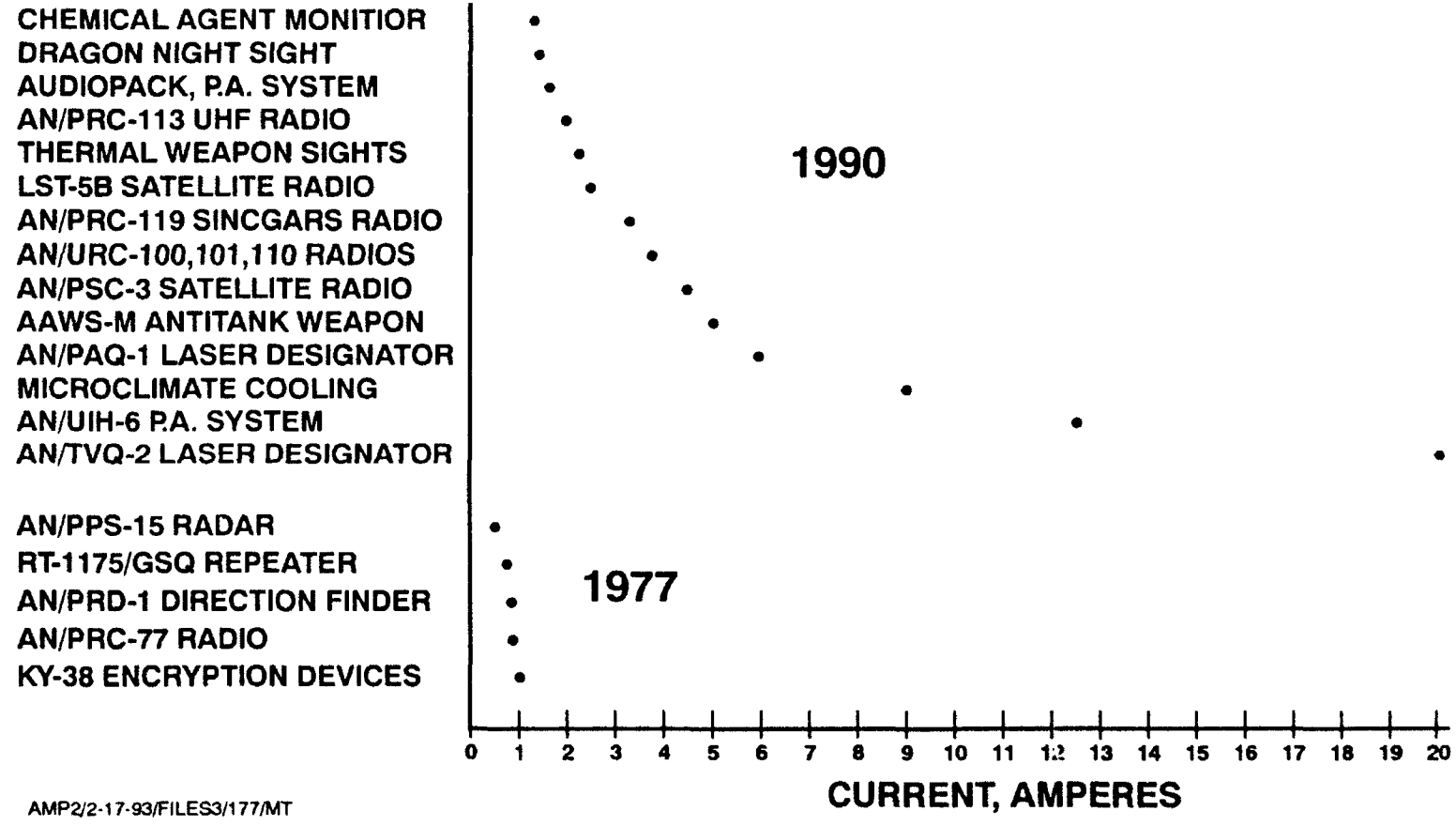
ALTERNATIVE POWER SOURCES

- Thermophotovoltaic Power Generation

POWER REQUIREMENT ADVANCES

US ARMY
RESEARCH LABORATORY

ELECTRONICS and POWER SOURCES

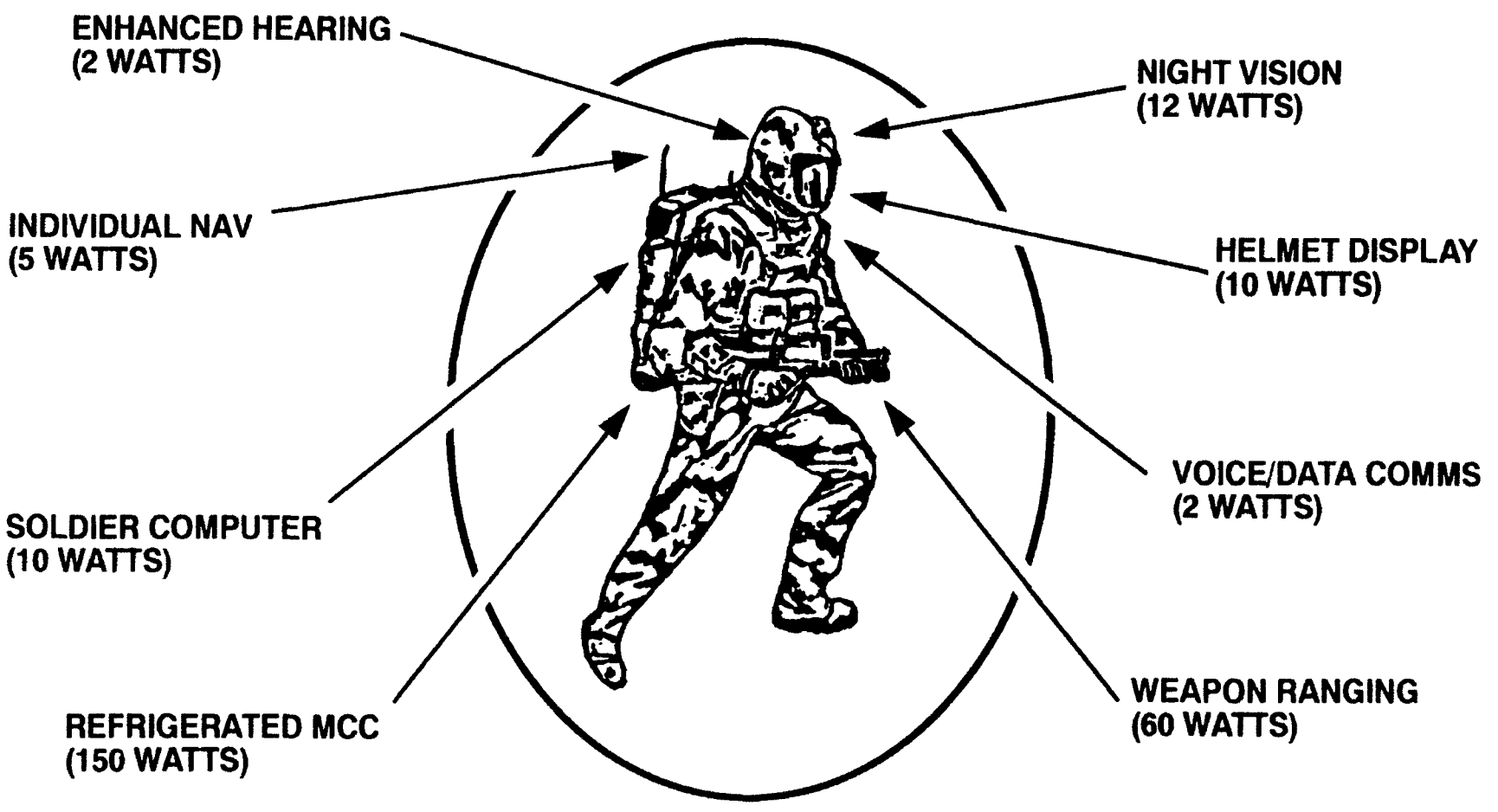


AMP2/2-17-93/FILES3/177/MT

LIGHT WEIGHT STEALTHY POWER SOURCES FOR SOLDIER SYSTEM

US ARMY RESEARCH LABORATORY

ELECTRONICS and POWER SOURCES



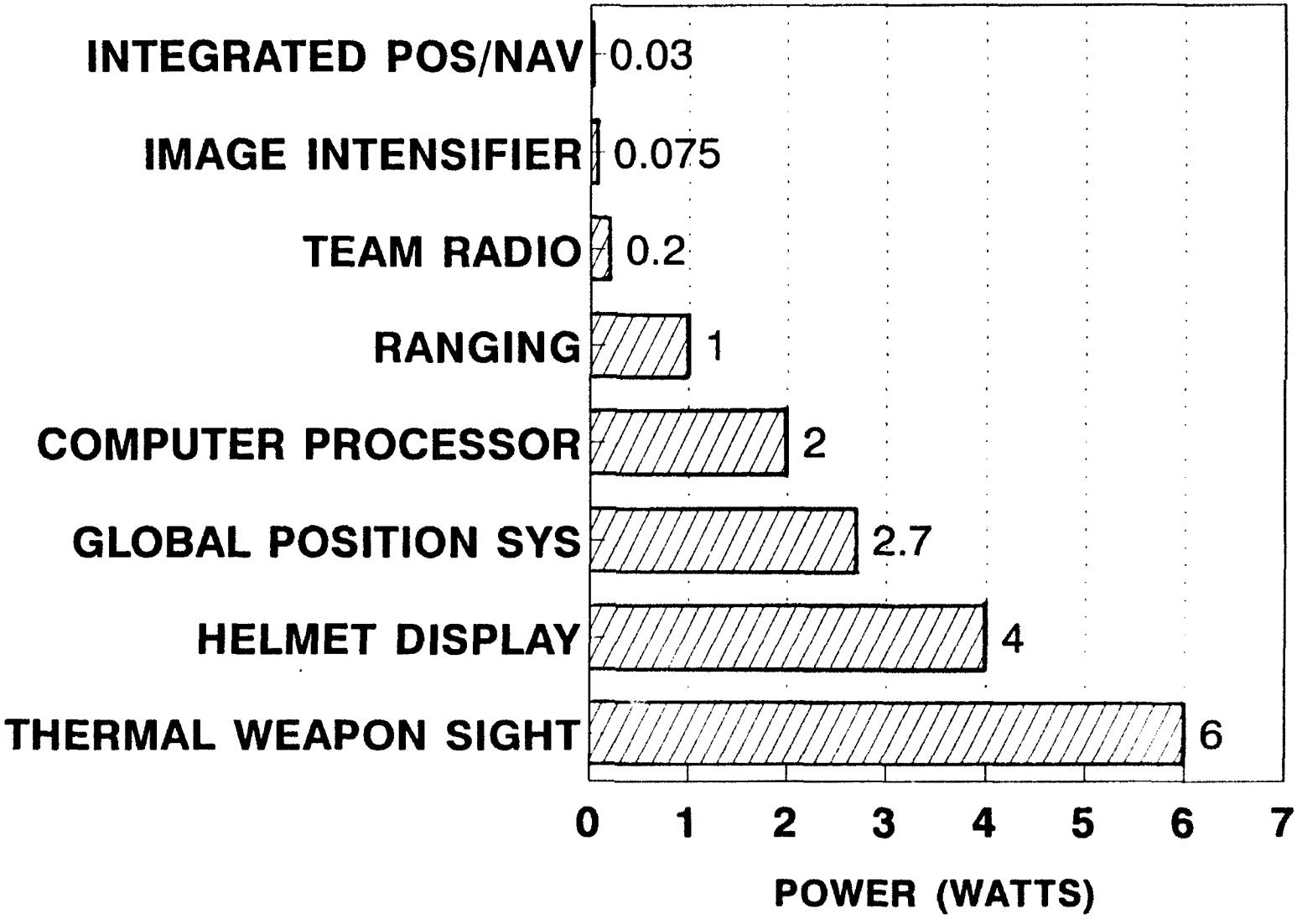
* THE FUTURE SOLDIER SYSTEM: EXOSKELETON (4500 WATTS)

SOLDIER/11-12-92/203/MT

21ST CENTURY LAND WARRIOR TOTAL ELECTRONICS POWER

US ARMY RESEARCH LABORATORY

ELECTRONICS and POWER SOURCES

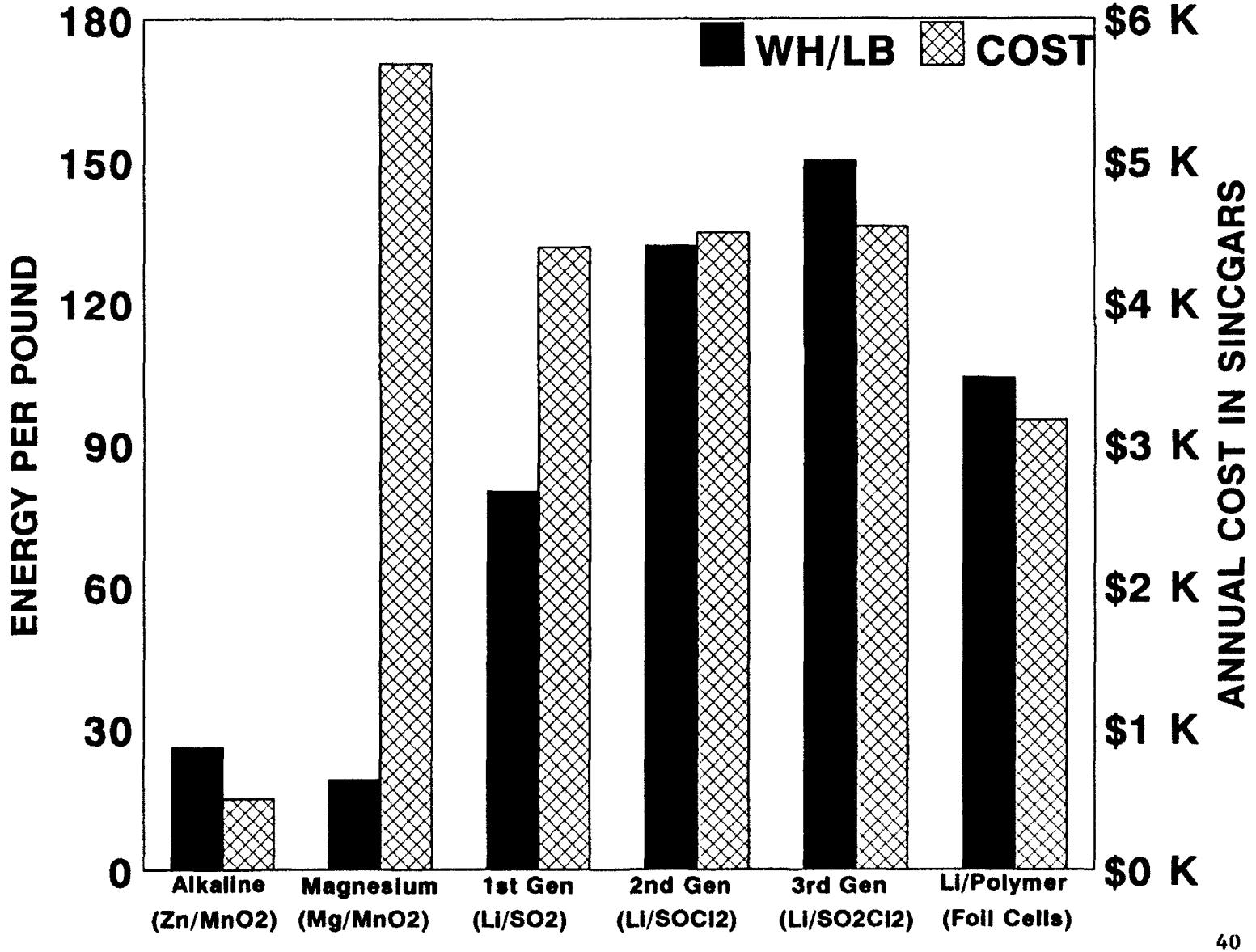


PRIMARY BATTERIES

ADVANCES IN PRIMARY BATTERIES

US ARMY RESEARCH LABORATORY

ELECTRONICS and POWER SOURCES



PRIMARY BATTERIES

FIRST GENERATION (Li/SO_2) 200 WH/kg NOW IN USE

1977

2nd & 3rd GENERATION (i.e.Li/SO_2Cl_2) 300 WH/kg

1992

Li/POLYMER (FOIL CELL) BATTERY 400+ WH/kg

1998

BARRIERS

- PASSIVATION (STORAGE)
- LIMITED EFFICIENCY
- STRUCTURAL WEIGHT

APPROACHES

- ION SELECTIVE INTER-FACES
- CATHODE CATALYSTS
- COMPOSITE MATERIALS

BARRIERS

- DEGRADING INTERFACES
- HIGH POWER/LOW TEMP PERFORMANCE
- LOW ENERGY CATHODES
- HIGH WEIGHT OF INERTS

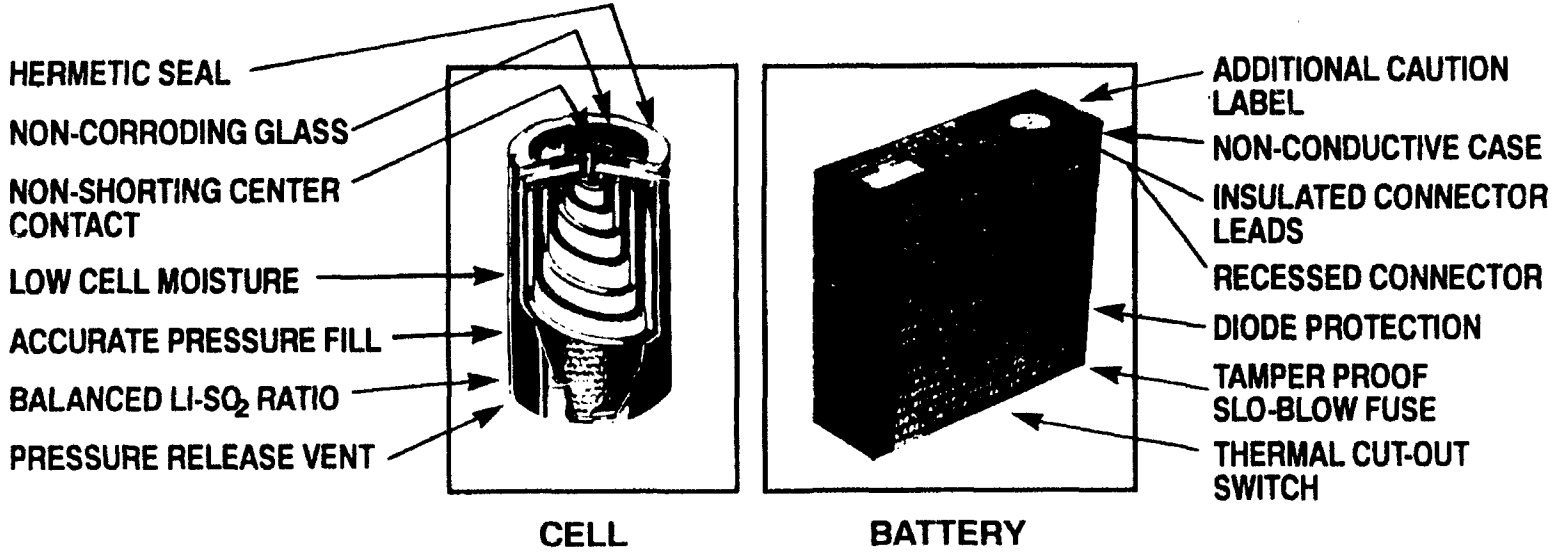
APPROACHES

- REDOX-STABLE POLYMERS
- HIGH CONDUCTIVITY POLYMERS
- HALIDE-BASED CATHODES
- BIPOLAR CONSTRUCTION

BUILT-IN LITHIUM BATTERY SAFETY FEATURES

US ARMY RESEARCH LABORATORY

ELECTRONICS and POWER SOURCES



- STRESS TEST AND ANALYZE SAMPLE BATTERIES
- ESTABLISH QUALITY PROGRAM PLAN
- ADDED Q.C. ABUSE TESTS

BATTERY/052793//206/SP

RECHARGEABLE BATTERIES

RECENT ARMY TRAINING BATTERY REQUIREMENTS

US ARMY RESEARCH LABORATORY

ELECTRONICS and POWER SOURCES

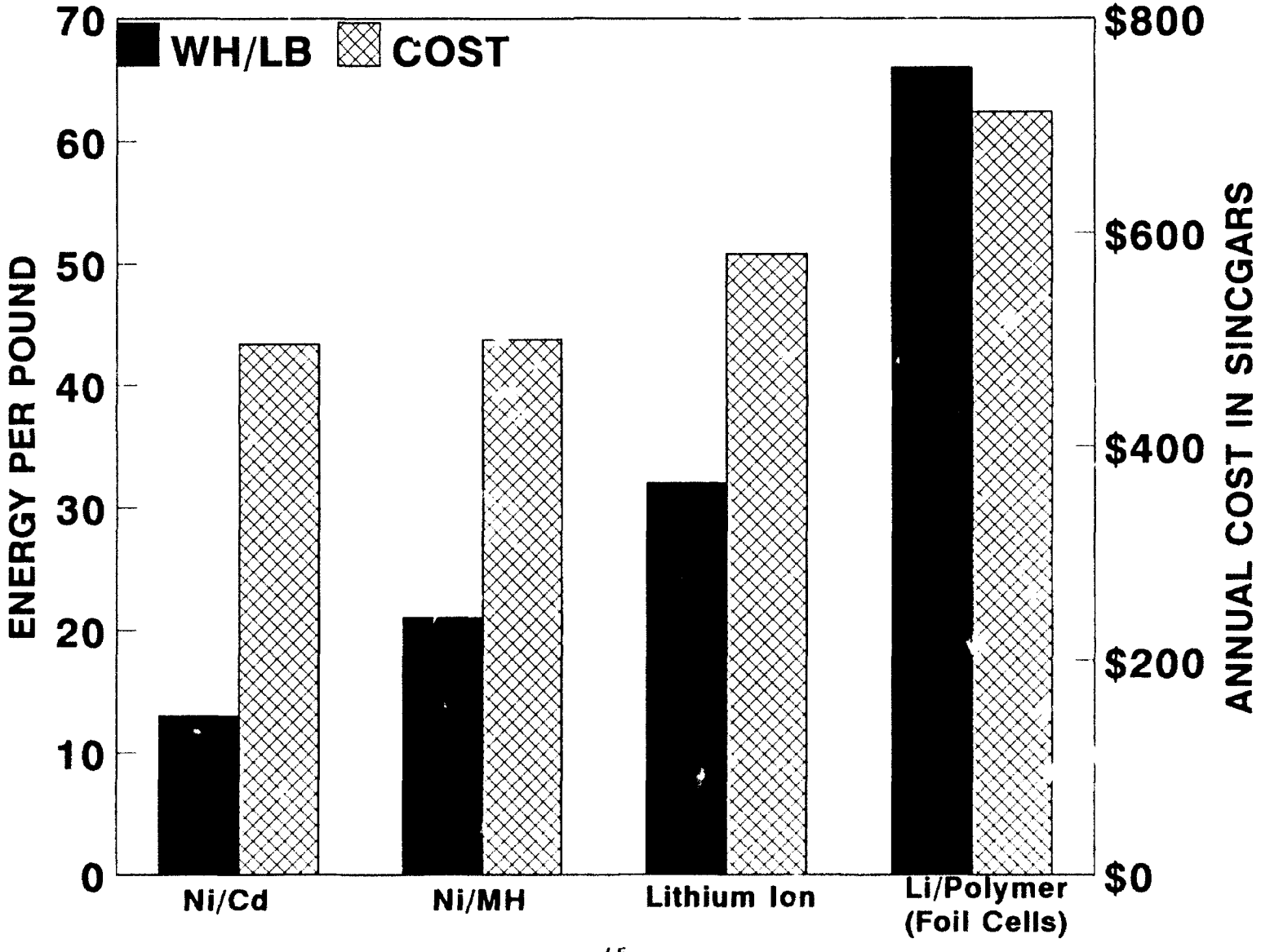
- RESULT FROM INCREASED EQUIPMENT POWER DEMANDS
  - •• EQUIPMENT USES MORE POWER
  - •• BATTERIES COST MORE
- NEEDS:
  - •• VERY LOW COST PRIMARY BATTERY
  - •• LOW COST, LIGHT WEIGHT RECHARGEABLE BATTERY
  - •• HIGHER CAPACITY/CYCLE RECHARGEABLE BATTERY

TRAINREQ

ADVANCES IN RECHARGEABLE BATTERIES

US ARMY RESEARCH LABORATORY

ELECTRONICS and POWER SOURCES



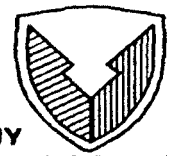
Comparison of Existing and Future Rechargeable Batteries BB590 size, 2.45x5x4.4"-24V

US ARMY RESEARCH LABORATORY

ELECTRONICS and POWER SOURCES

	Wh/Kg	AH	Safety	Cycles	Comments/Limitation
Products Available					
Ni Metal Hydride	40	3.0	+	150+	Potential for improvement
NiCd	30	2.0	+	200+	Heavy/Low mission life
Lead-Acid	25	1.6	+	100	Heavy/Low mission life
Silver-Zinc	110	6.0	+	50	1 year shelf life
Future Production					
Li-ion	100	3.5	?	200+	Low weight, long life/safety unresolved
Nickel-Zinc	60	2.8	+	100+	Requires a product development
Alk Manganese	40	2.5	+	20	Under dev./Not yet available
Metallic Li	160	7.0	?	50	Safety/risk to be determined

CHARACTERISTICS OF NICKEL - METAL HYDRIDE BATTERIES



US ARMY
RESEARCH LABORATORY

ELECTRONICS and POWER SOURCES

- 50% INCREASE IN ENERGY CONTENT PER VOLUME OF NiCd
- VERY SIGNIFICANT OPERATING COST BENEFIT OVER PRIMARY BATTERIES
- UTILIZES NO TOXIC HEAVY METALS
- UTILIZES TECHNOLOGY THAT HAS COMMERCIAL APPLICATIONS
- RELATIVELY SAFE TECHNOLOGY
- FUTURE IMPROVEMENT POTENTIAL i.e. UP TO 4-5 AHR

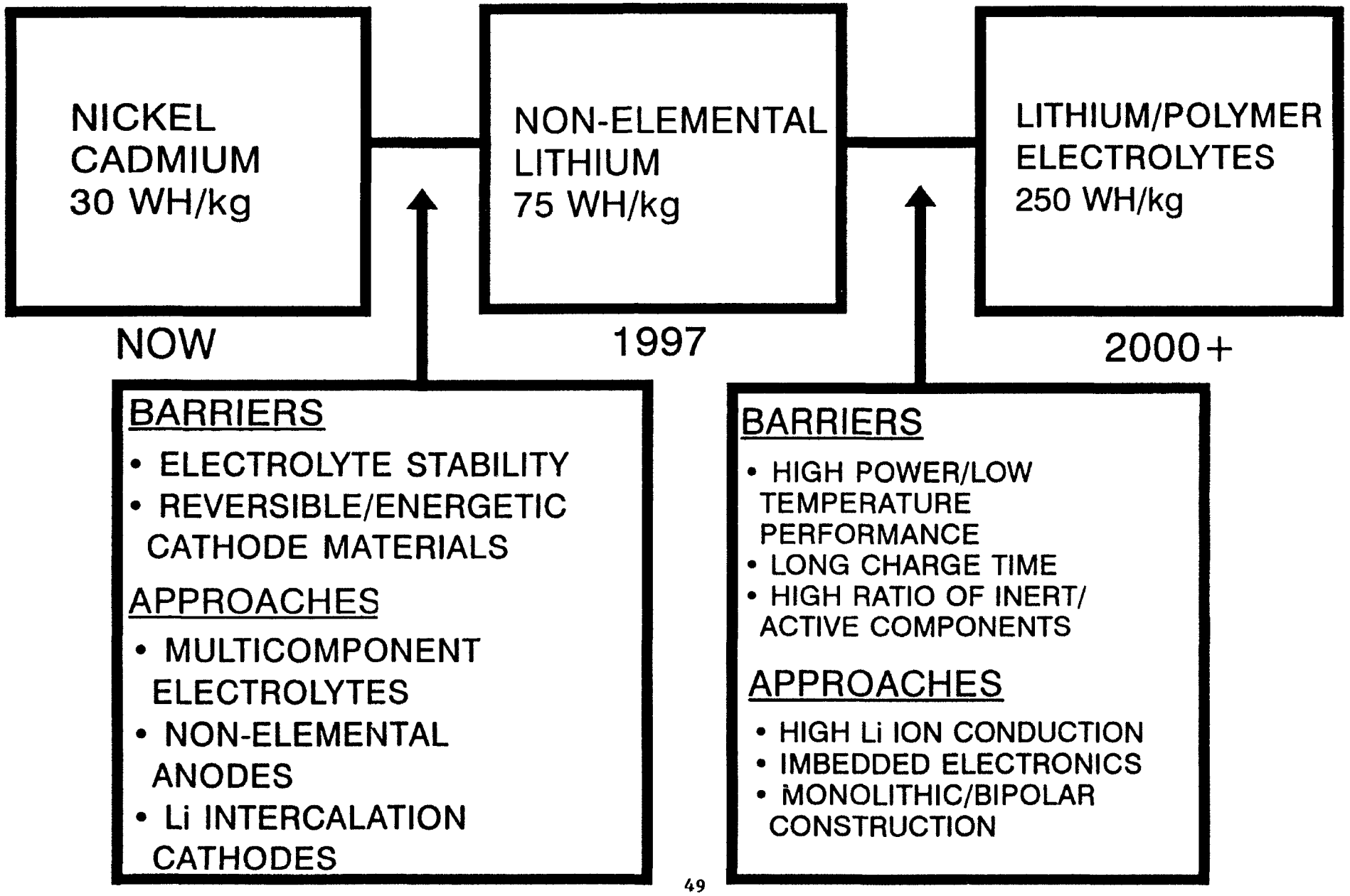
CHARACTERISTICS OF LITHIUM-ION BATTERIES

US ARMY RESEARCH LABORATORY

ELECTRONICS and POWER SOURCES

- OVER THREE TIMES ENERGY CONTENT PER WEIGHT OF NiCd
- VERY SIGNIFICANT OPERATING COST BENEFIT OVER PRIMARY BATTERIES
- NO FREE LITHIUM METAL - ENVIRONMENTALLY LESS REACTIVE
- LOW POWER, COMMERCIAL APPLICATIONS IDENTIFIED
- LIMITED COMMERCIAL PRODUCTION BASE
- CYCLE-LIFE EQUAL TO NiCd

RECHARGEABLE BATTERIES

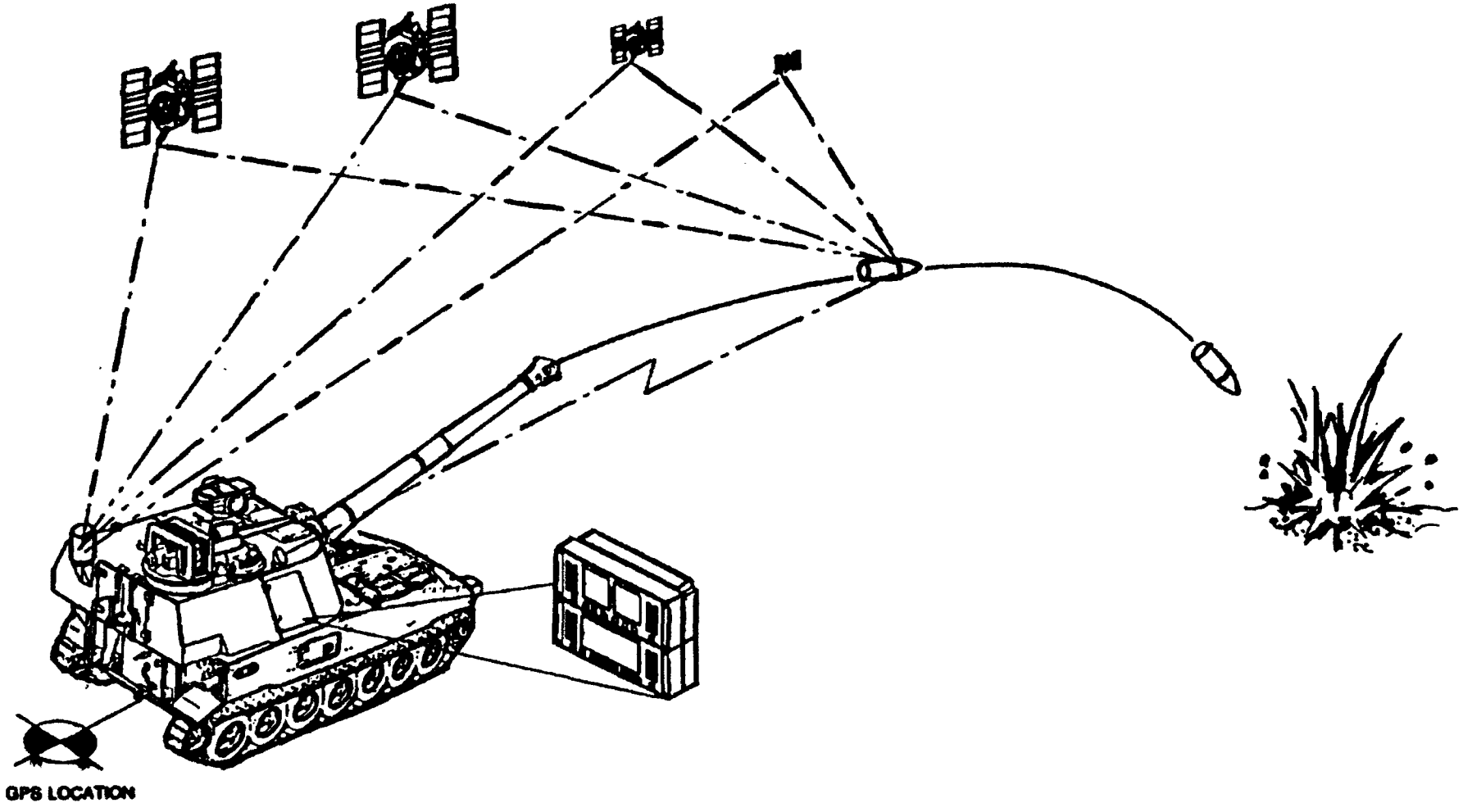


OTHER POWER SOURCES

RESERVE POWER SUPPLIES

TWO GENERAL TYPES

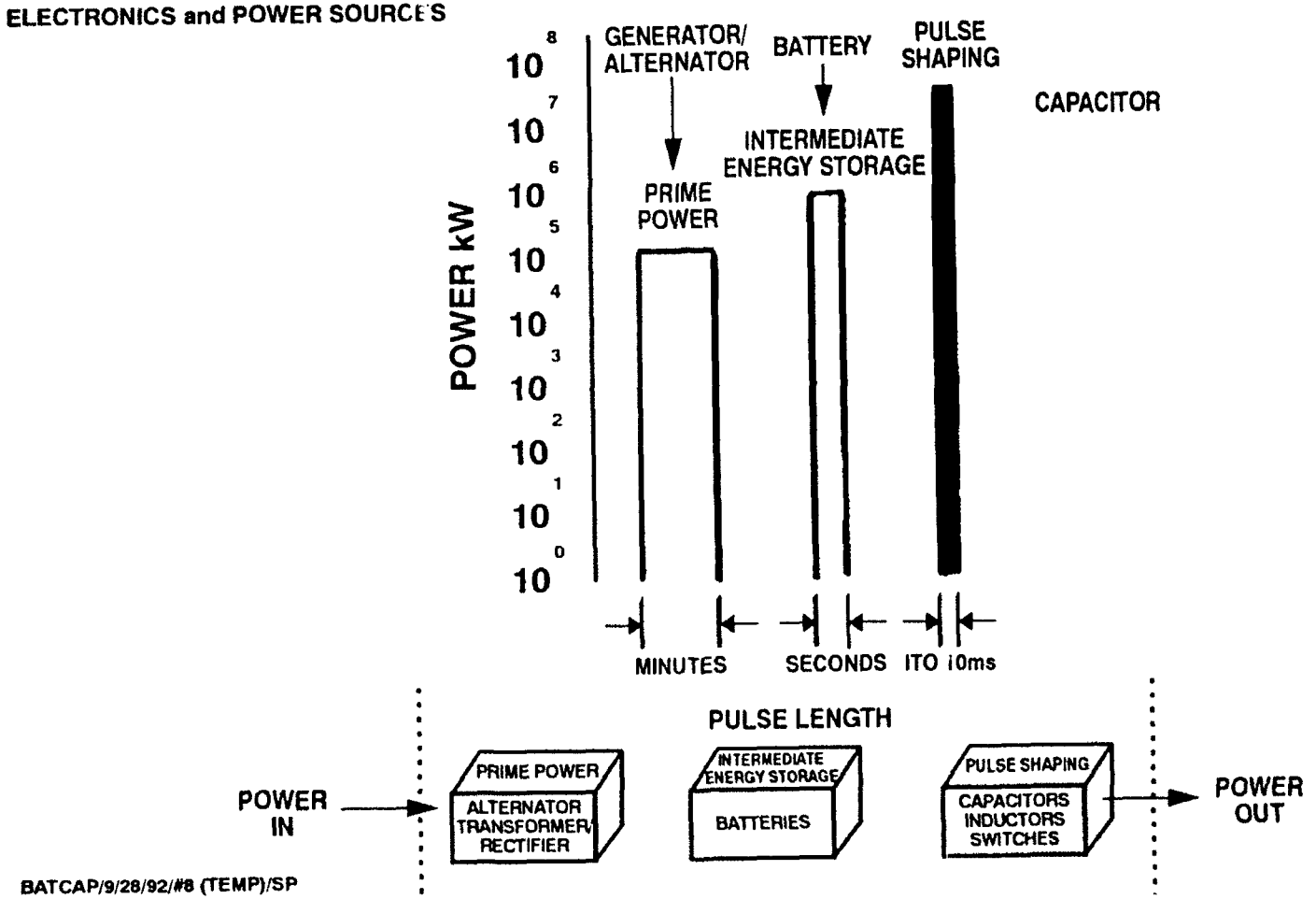
- LIQUID ELECTROLYTE RESERVE BATTERIES FOR SPIN-STABILIZED ORDNANCE
- THERMAL RESERVE BATTERIES FOR NON-SPIN ORDNANCE


GPS LOCATION

BATTERY/CAPACITOR-BASED POWER FOR TACTICAL ELECTRIC GUNS

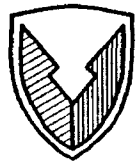
US ARMY RESEARCH LABORATORY

ELECTRONICS and POWER SOURCES



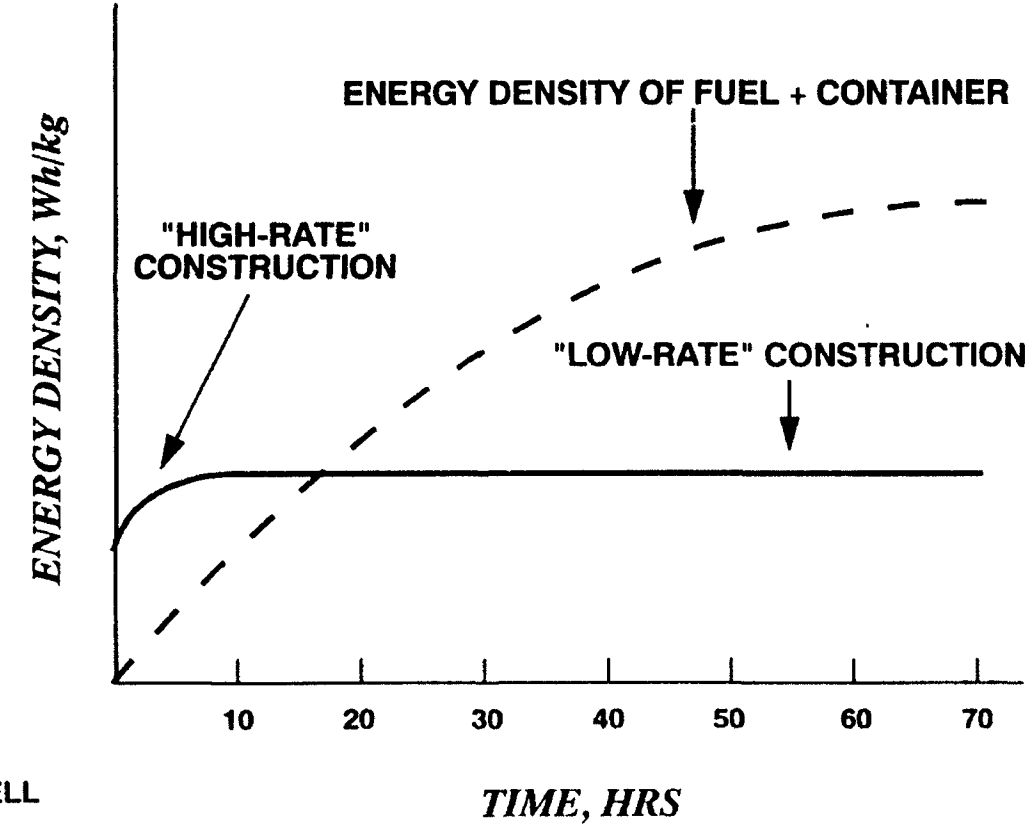
BATCAP/9/28/92/#8 (TEMP)/SP

FUEL CELLS

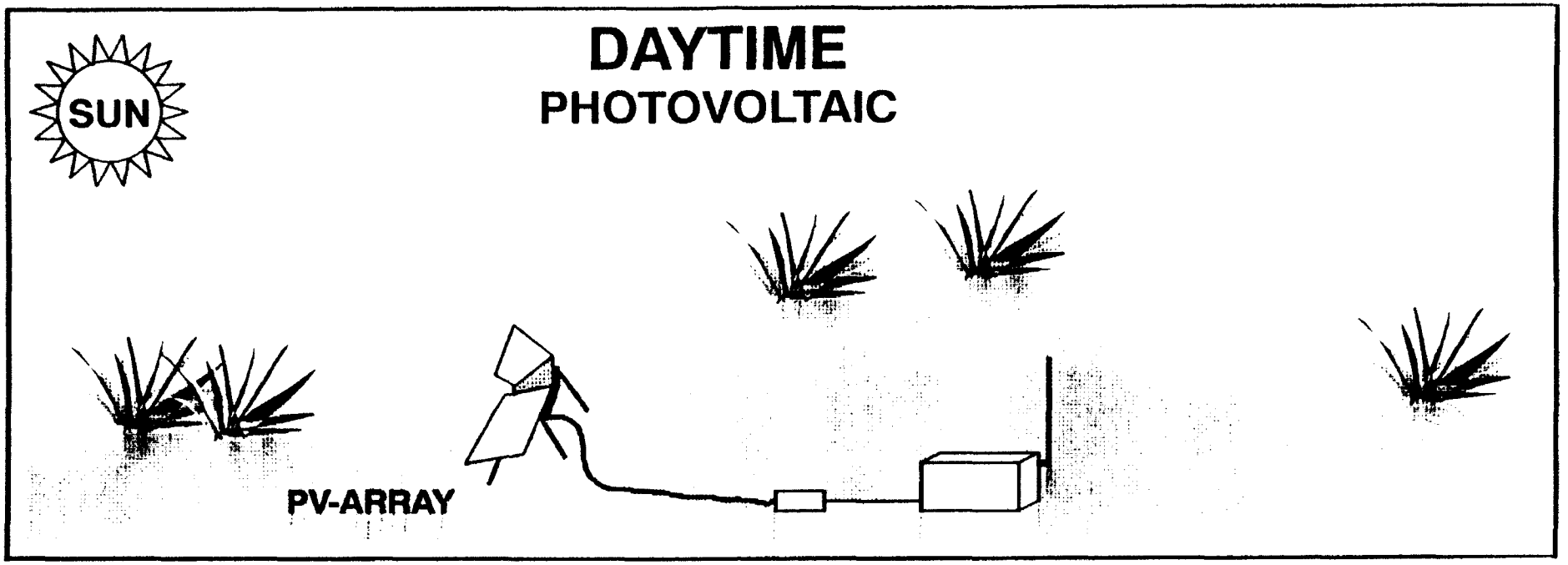


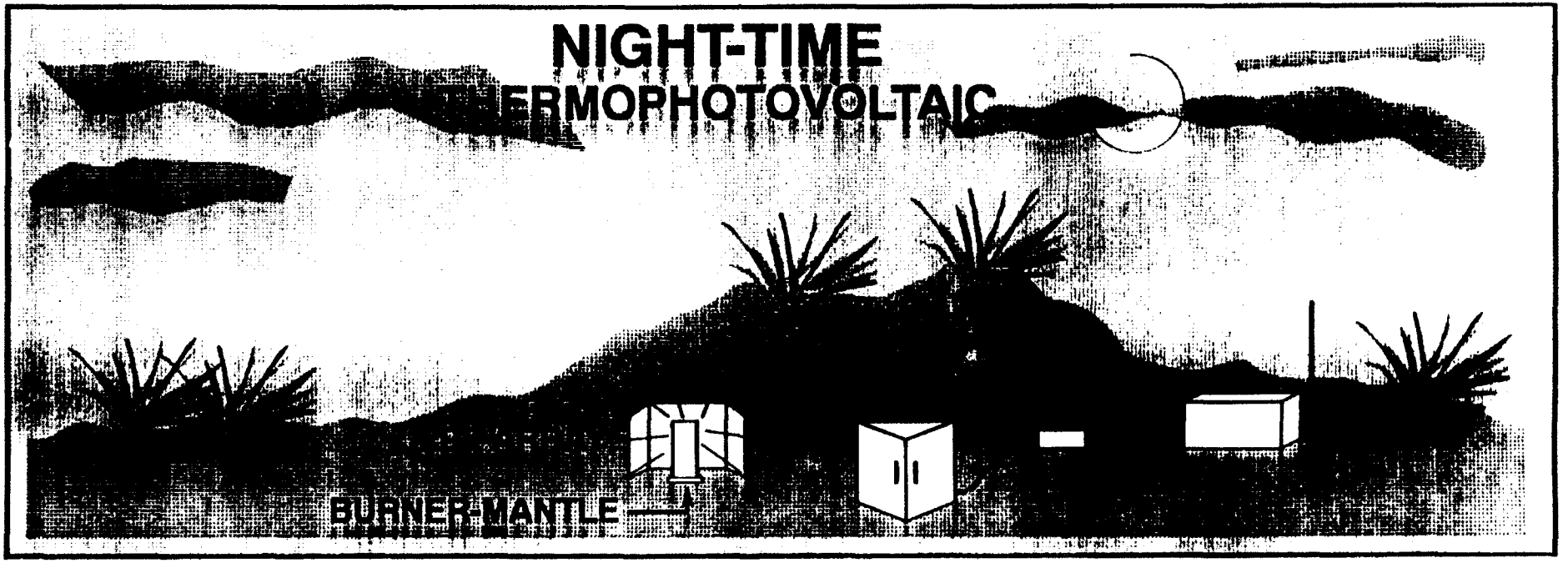
US ARMY
RESEARCH LABORATORY

ELECTRONICS and POWER SOURCES



GR341B/012293/#5/SP





DAYTIMEbw/032691/EPS/203/IV

BAA'S AND SBIR'S

PRESENT AND FUTURE BAA'S

US ARMY RESEARCH LABORATORY

ELECTRONICS and POWER SOURCES

FY93

- HIGH ENERGY - HIGH POWER NONRECHARGEABLE (24)
- FUEL CELL HYDROGEN GENERATOR & CELL STACK (24)
- LITHIUM - ION, BB-X590 (18)
- RECHARGEABLE ZINC - ALKALINE (24)

FY 94

- LITHIUM-ION, FAMILY (24)
- HIGH TEMPERATURE SOLID OXIDE FUEL CELL (48)
- NICKEL-METAL HYDRIDE POUCH BATTERY (24)

( )MONTHS

PRESENT AND FUTURE SBIR PROPOSALS

US ARMY RESEARCH LABORATORY

ELECTRONICS and POWER SOURCES

FY 93

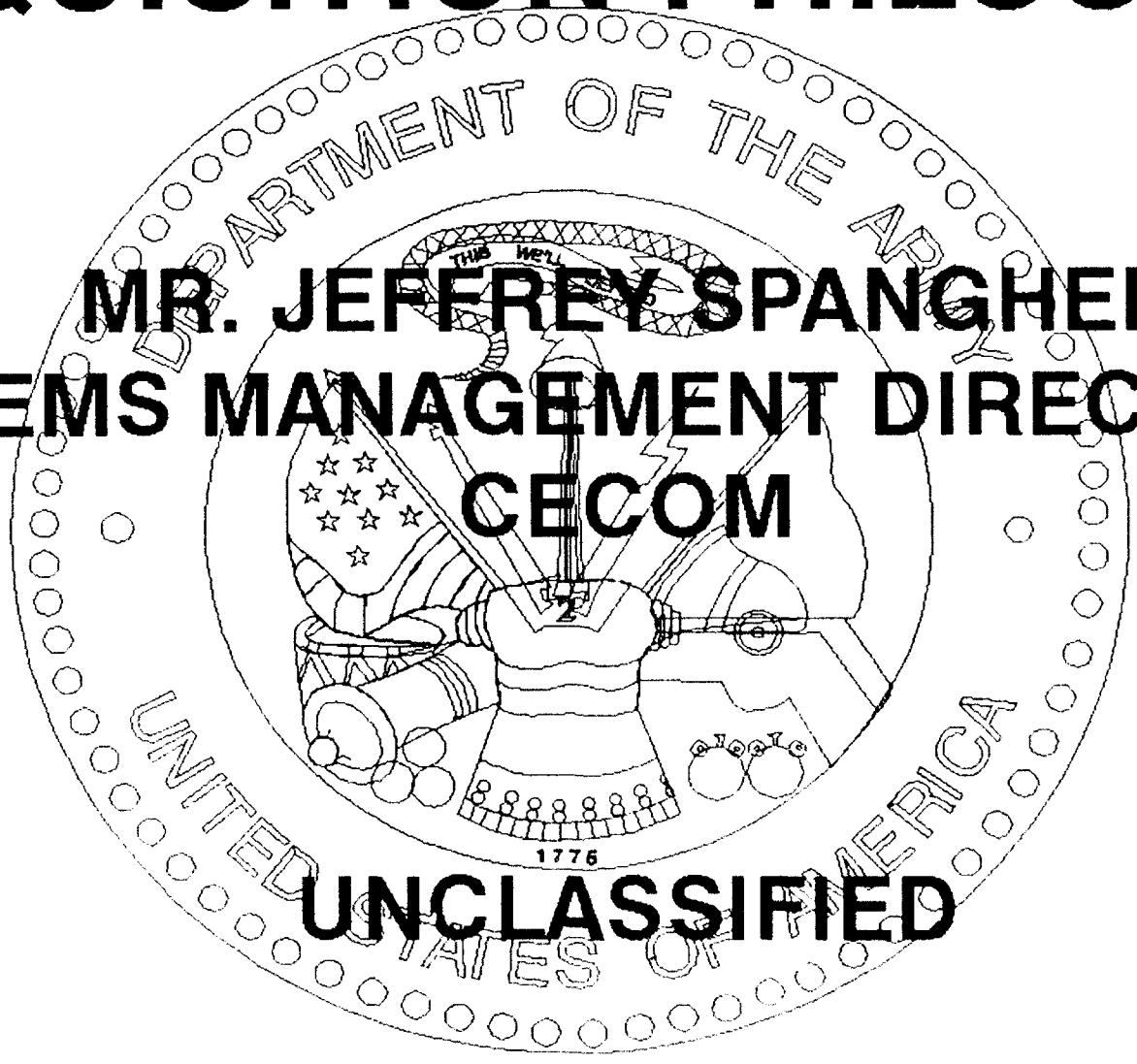
- POLYMER ELECTROLYTES FOR PRIMARY AND RECHARGEABLE BATTERIES
- POLYMER ELECTROLYTE MEMBRANES FOR FUEL CELLS AND BATTERIES

FY 94

- POLYMER ELECTROLYTES FOR PRIMARY AND RECHARGEABLE BATTERIES
- METHANOL FUEL CELL ELECTROLYTES AND MODULES

NOTES

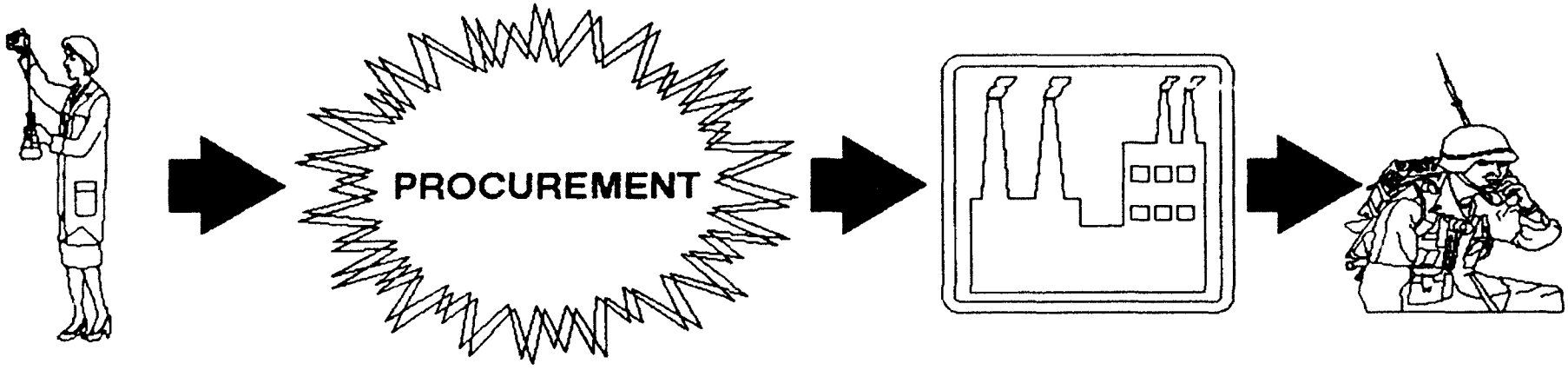
ACQUISITION PHILOSOPHY



MR. JEFFREY SPANGHER
SYSTEMS MANAGEMENT DIRECTORATE
CECOM

UNCLASSIFIED

BRINGING POWER TO THE USER



RESEARCH & DEVELOPMENT

ACQUISITION PHILOSOPHY

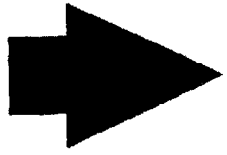
PRODUCTION

FIELDING

STEPS TO THE NEXT GENERATION

LITHIUM SO2

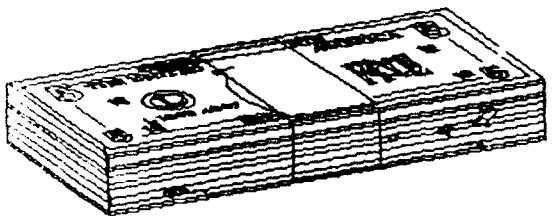
INTERIM REPLACEMENT OF NICADS



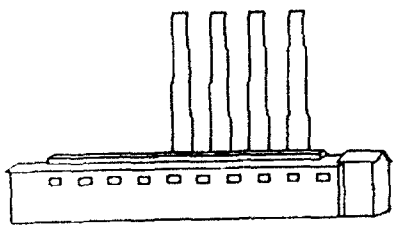
OBJECTIVE:
* RECHARGEABLE
* PRIMARY
* AIRCRAFT

INTERIM OMNIBUS AIRCRAFT

ACQUISITION PHILOSOPHY GOALS



LOW UNIT PRICE
COST EFFECTIVE



DUAL USE TECHNOLOGY
AUTOMATED FACILITIES
RAPID SURGE PRODUCTION

TOMORROW'S
POWER
SOURCES

OTHER CONSIDERATIONS

- RECYCLING:
  - BATTERY CASES
  - BATTERY ELECTRONICS
  - RAW MATERIALS
- DIRECT SHIPMENT FROM CONTRACTOR TO USER
- PERFORMANCE ORIENTED SPECIFICATIONS
- "D CELL" CONCEPT
- CONTRACT INCENTIVES

SCHEDULE

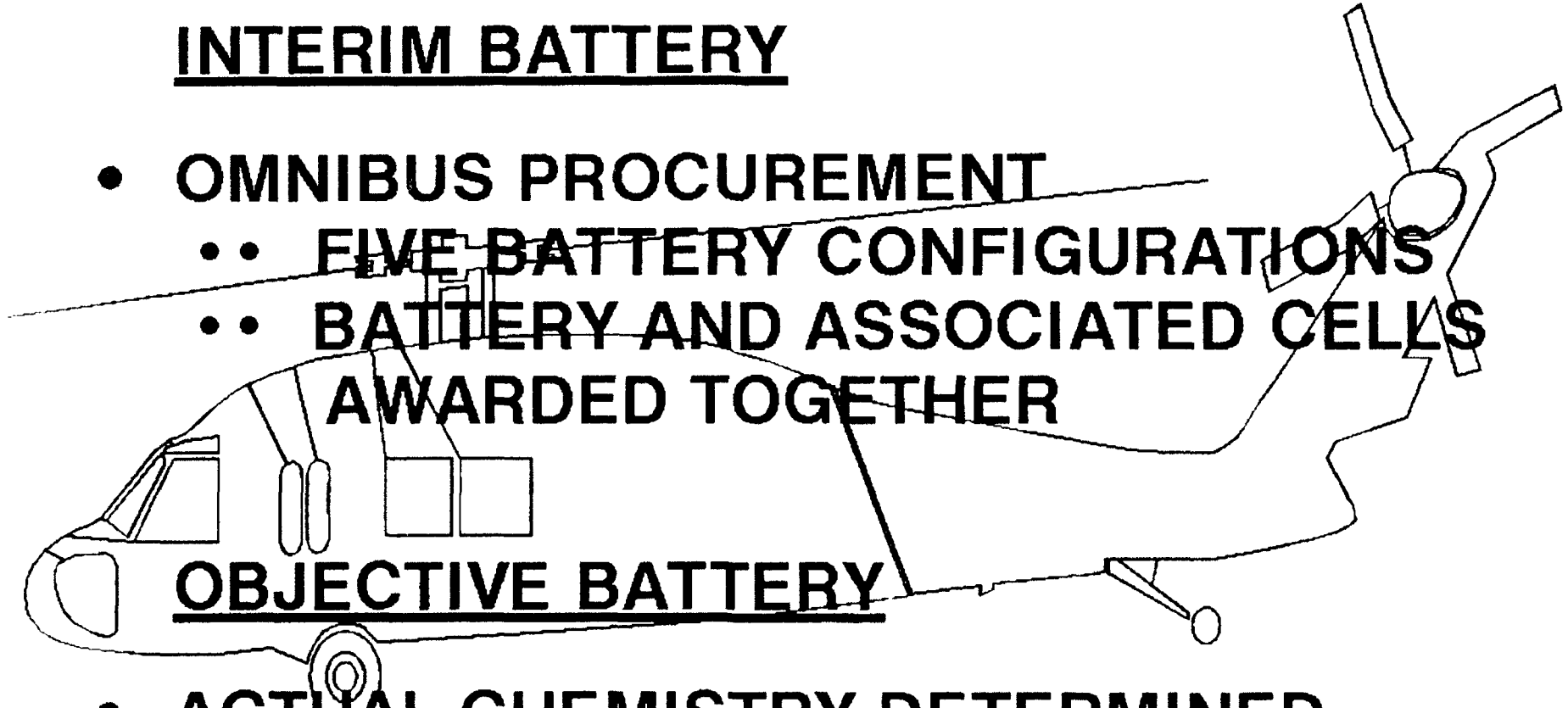
ACTION	FY94	FY95	FY96	FY97	FY98
AIRCRAFT					
INTERIM	A	F			
OBJECTIVE			A	F	
REPLACE NICAD					
INTERIM	A	F			
OBJECTIVE			A	F	
REPLACE LI/SO2					
OBJECTIVE			A	F	

A = CONTRACT AWD, F = AVAILABLE TO FIELD

AIRCRAFT BATTERIES

INTERIM BATTERY

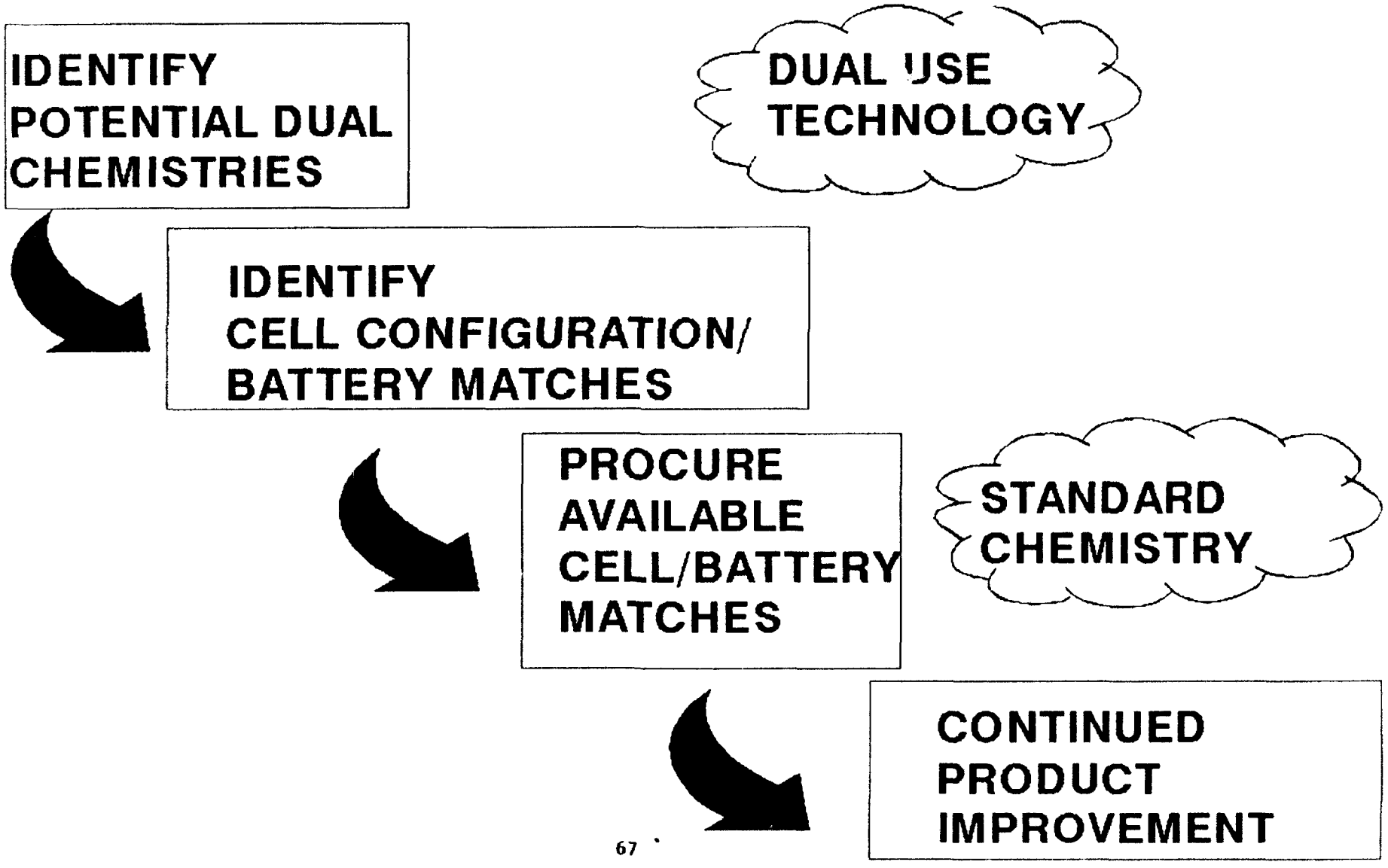
- OMNIBUS PROCUREMENT
  - FIVE BATTERY CONFIGURATIONS
  - BATTERY AND ASSOCIATED CELLS AWARDED TOGETHER



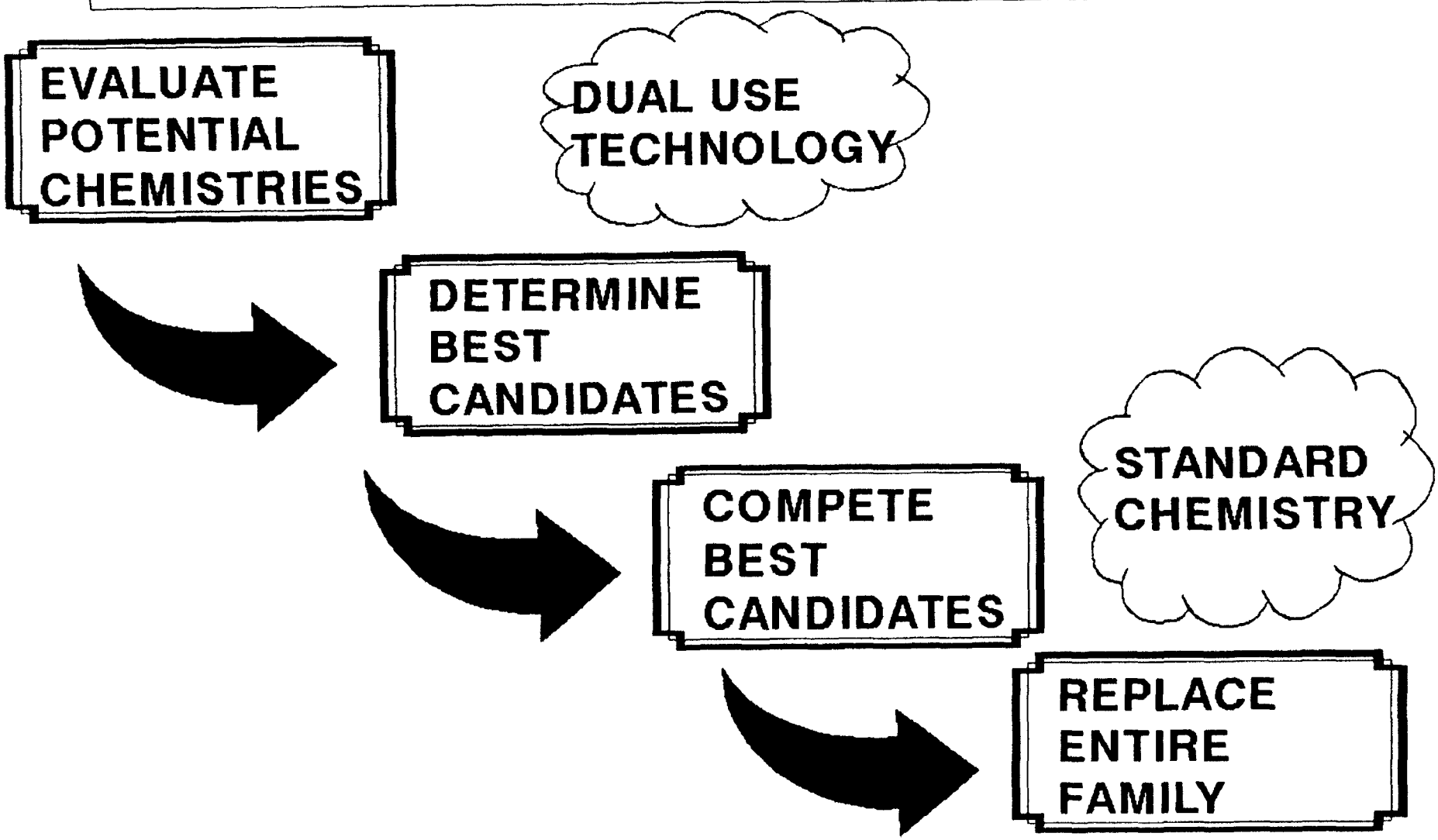
OBJECTIVE BATTERY

- ACTUAL CHEMISTRY DETERMINED BY FLY OFF

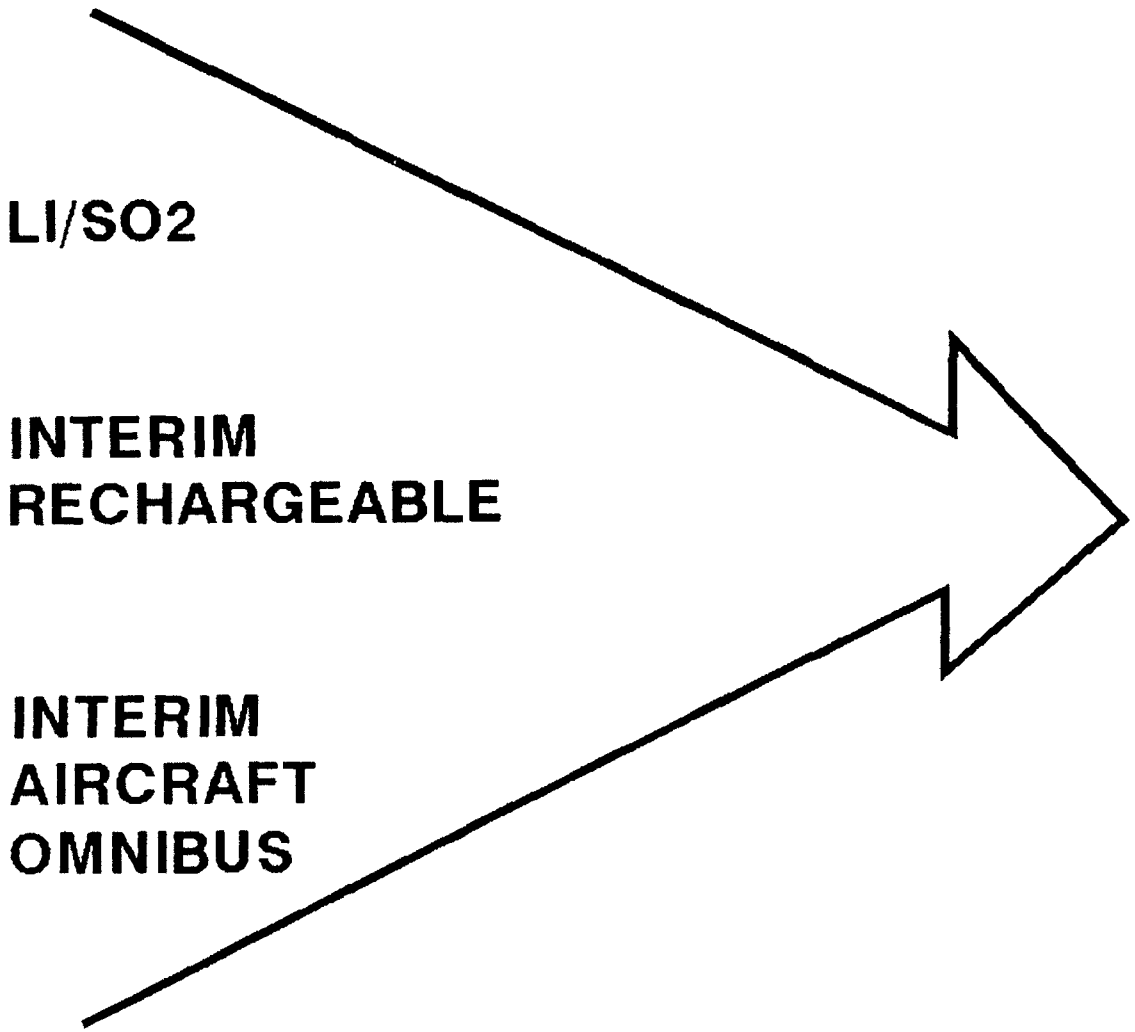
INTERIM RECHARGEABLE BATTERIES



OBJECTIVE PRIMARY AND RECHARGEABLE BATTERIES



ACQUISITIONS



OBJECTIVE:

* AIRCRAFT
* PRIMARY
* RECHARGEABLE

NOTES

SESSION II

REDUCTION OF BATTERY RELATED OPERATING AND SUPPORT COSTS

BATTERY STANDARDIZATION

MR. JEFFREY SPANGHER
SYSTEMS MANAGEMENT DIRECTORATE
CECOM

UNCLASSIFIED

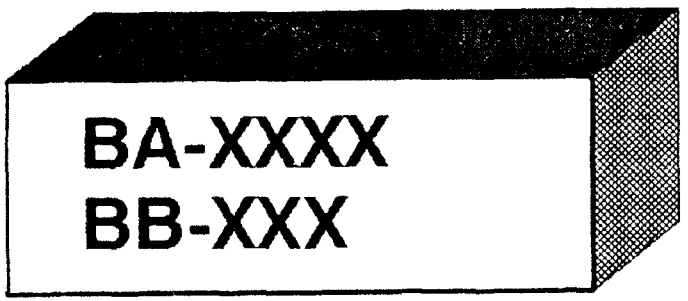
BATTERY STANDARDIZATION GOALS

- REDUCE NUMBER OF BATTERIES
- ONE BATTERY PER VOLTAGE
- INFLUENCE END ITEM DESIGN
- ELIMINATE BATTERY PROLIFERATION
- REDUCE BATTERY RELATED O&S COSTS

STANDARD CHEMISTRIES & CONFIGURATIONS

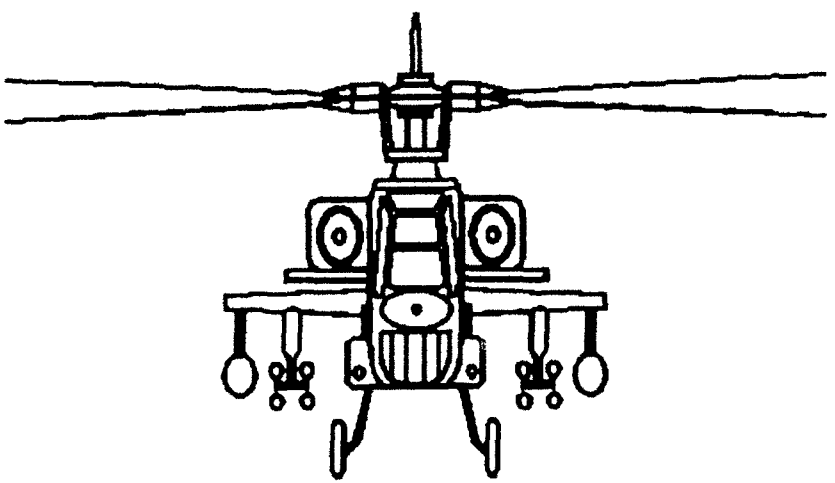
CECOM MANAGED BATTERIES

C/E BATTERIES



213 BATTERY TYPES
SUPPORT 500+ END ITEMS

11 LITHIUM SO2 BATTERY TYPES
SUPPORT 100+ ITEMS



9 BATTERY TYPES
9 AIRCRAFT

BATTERY PROLIFERATION

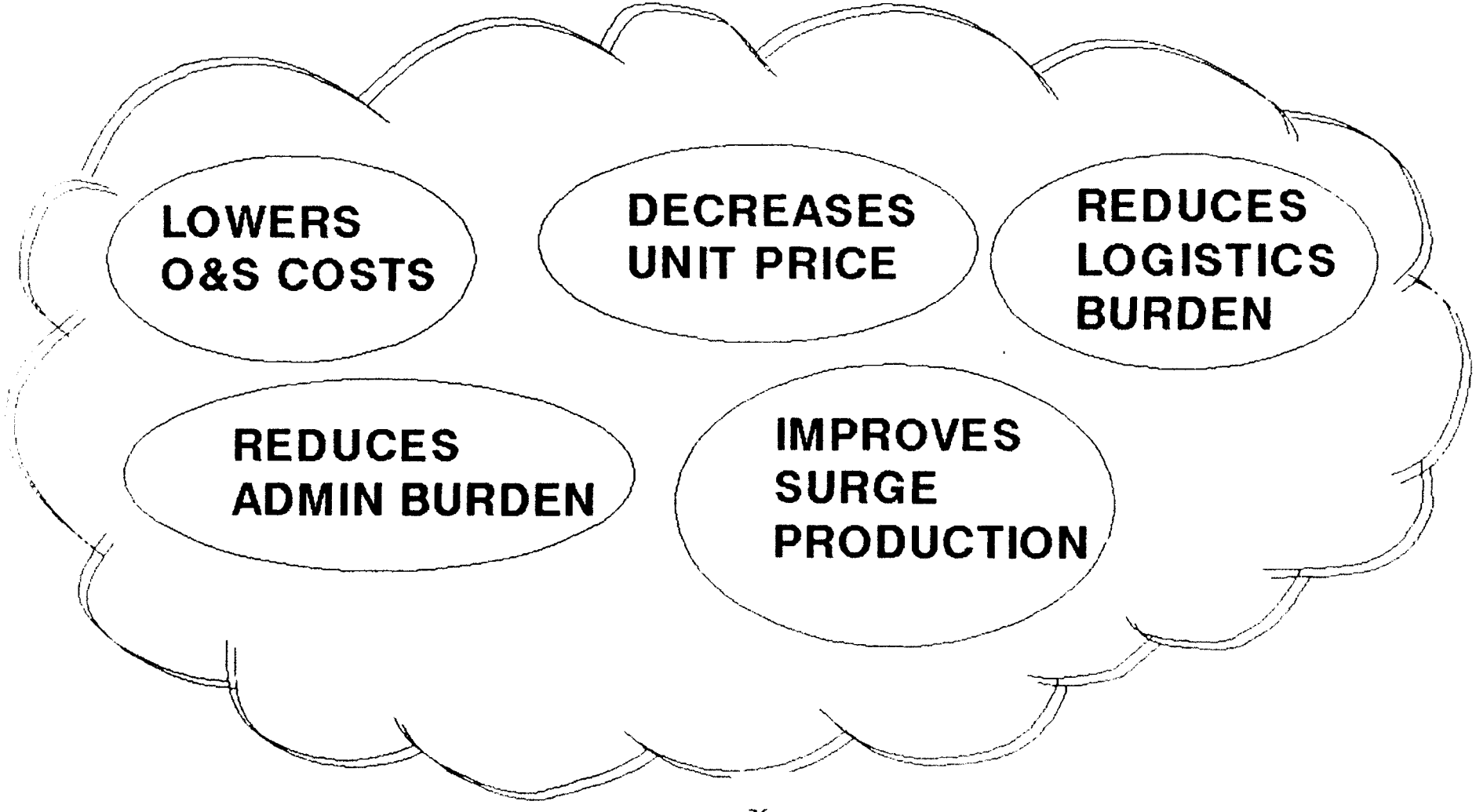
CAUSES:

- ✓ USER REQUIREMENTS
- ✓ CONTRACTOR DESIGN SOLUTIONS
- ✓ NDI PROCESS

IMPACT:

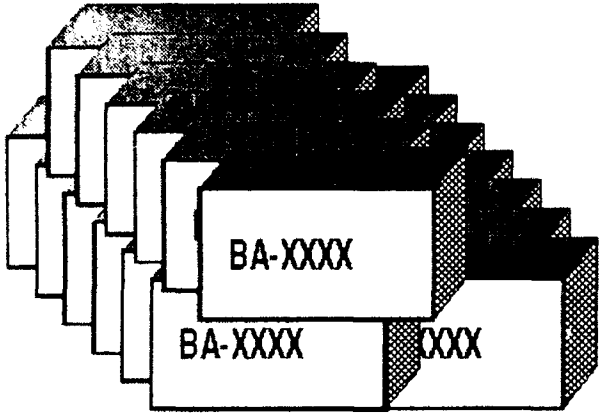
- ✓ INCREASE IN NUMBER OF BATTERY TYPES
- ✓ HIGH UNIT PRICE
- ✓ INCREASED O&S COSTS
- ✓ LIMITED PRODUCTION CAPABILITY
- ✓ INCREASED LOGISTICAL BURDEN

BATTERY STANDARDIZATION



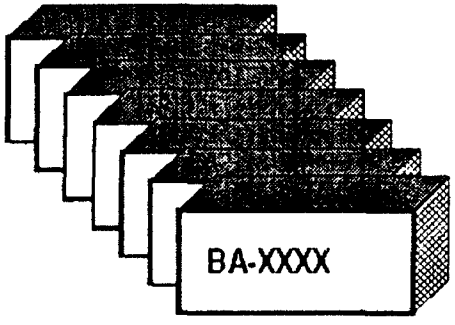
C\E BATTERY STANDARDIZATION

YESTERDAY



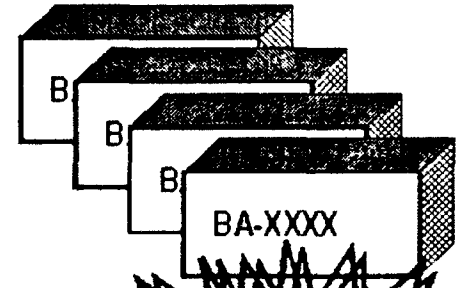
UNCONTROLLED PROLIFERATION

TODAY



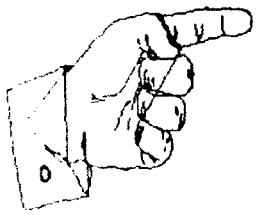
STANDARD LI/SO2 BATTERIES

TOMMORROW



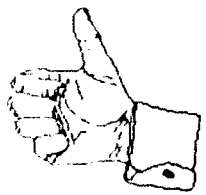
4 STANDARD BATTERIES

FUTURE STANDARDIZATION



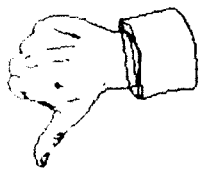
MOST DESIRABLE:

USE OF STANDARD CONSUMER CONFIGURATIONS (A,C,D,9V CELLS)



ACCEPTABLE:

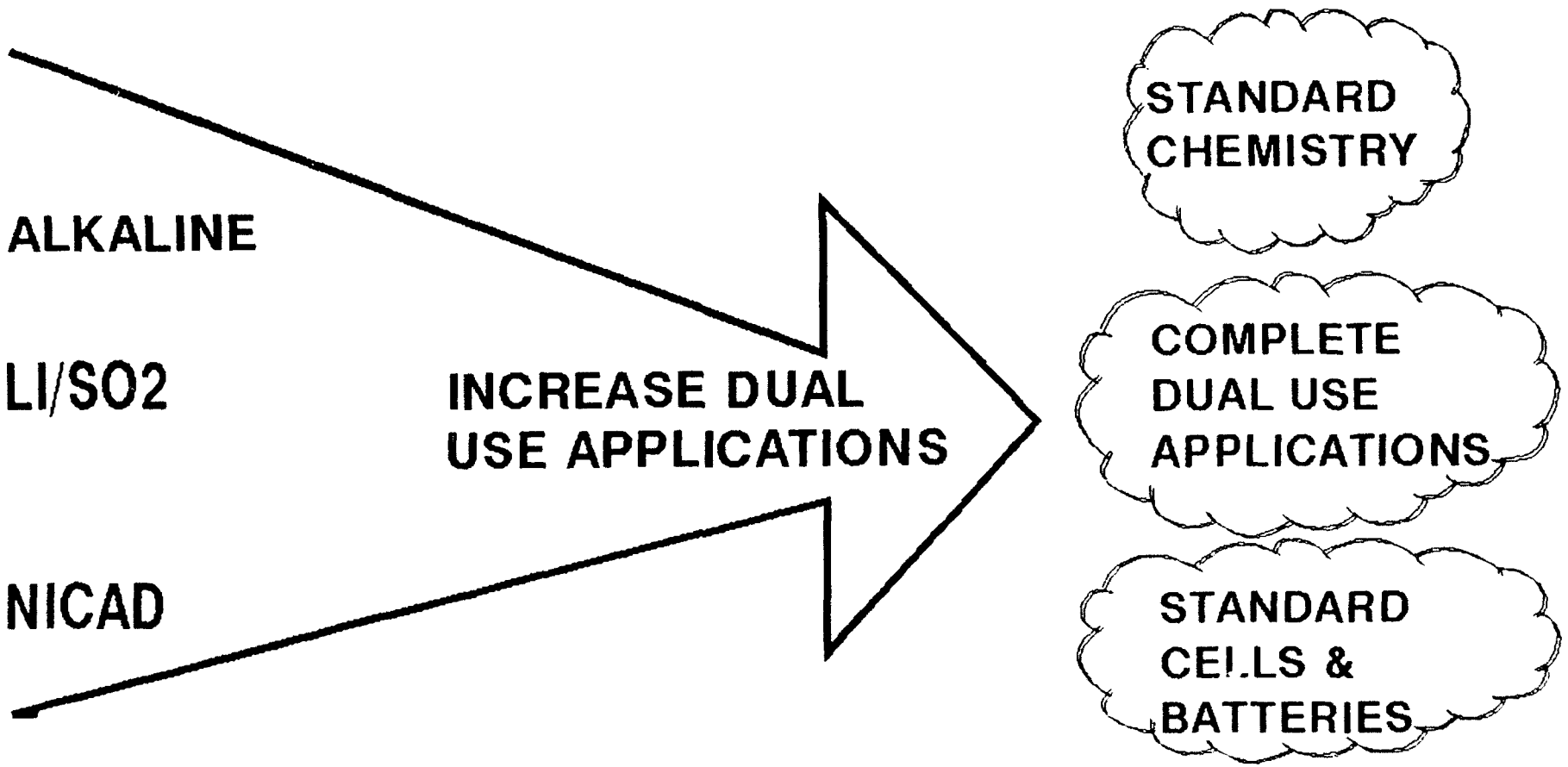
USE OF MILITARY STANDARD BATTERY ALREADY IN INVENTORY



UNDESIRABLE

- USE OF NEW DESIGN
- USE OF NEW MILITARY UNIQUE CHEMISTRY

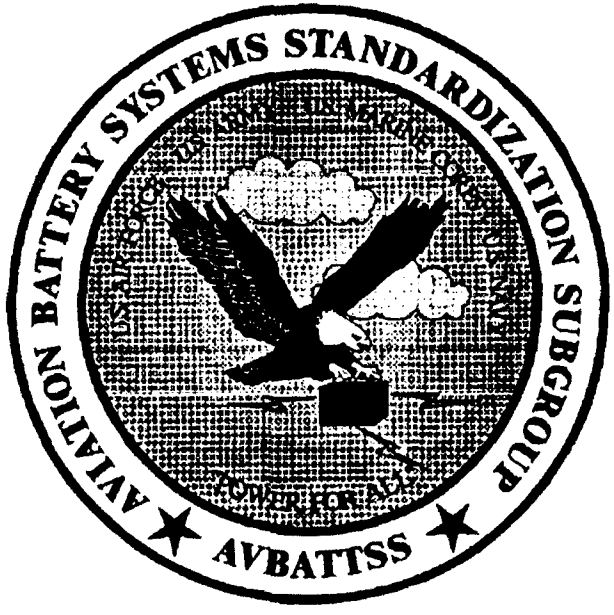
BATTERY STANDARDIZATION



BATTERY STANDARDIZATION IS AN ONGOING EFFORT

NOTES

DEPARTMENT OF DEFENSE AVIATION BATTERY SYSTEMS STANDARDIZATION (AVBATTSS)



MR. DAN KIEFFNER
CHAIRMAN, AVBATTSS
(812) 854-1593

UNCLASSIFIED

OUTLINE

* AVBATTSS BACKGROUND

* COOPERATIVE EFFORTS TO DATE

* PRESENT PROGRAMS

* FUTURE ACTIONS

DoD BATTERY BACKGROUND

* PRESENT IN ALL WEAPONS SYSTEMS AND MANY SUBSYSTEMS
* ANNUAL PROCUREMENT ≥ $250M
* VIRTUALLY UNCONTROLLED PROLIFERATION
* TECHNOLOGICAL OBSOLESCENCE

AVIATION BATTERY SYSTEMS STANDARDIZATION SUBGROUP (AVBATTSS)

- CHARTERED BY AVIATION ACQUISITION CMDRS.
  (NAVAIR, AFMC/ASC, ATCOM)

- PARTICIPATING ORGANIZATIONS:

ATCOM	AFMC/ASC	NAVAIR
ARL	WRIGHT LABS	NSWC CRANE
CECOM	SACRAMENTO ALC	NAVSUP
DGSC	OKLA. CITY ALC	CASC
OGDEN ALC		

- CHARTERED AVBATTSS TO COORDINATE <u>ALL</u> AVIATION BATTERIES

  (MAIN, SUPPORT EQUIP, AVIONICS, MUNITIONS, LIFE SUPPORT/SURVIVAL)

AVBATTSS MISSION

- ELIMINATE DUPLICATE EFFORTS
- REDUCE PROLIFERATION
- REDUCE OPERATING & SUPPORT COSTS
- JOINT SPECS/PROCUREMENTS
- COORDINATE WITH OTHER JACG SUBGROUPS
- INCREASE BATTERY RELIABILITY
- UNIFIED APPROACH TO HANDLING HAZARDOUS BATTERY MATERIALS

EARLY SUCCESSES

- ARMY STANDARD BATTERIES IN JTIDS, SSBA, AN/AVS-5, SFIR, OTHERS (BA-5XXX SERIES)
- USE OF OTHER SERVICES' CAPABILITIES
- TRI-SERVICE DATABASE
  - USED BY DoD, OEMs FOR BATTERY SEARCHES
  - CONTAINS TECHNICAL ATTRIBUTES BY NSN
  - 77 DATACALLS IN LAST 12 MONTHS
- NETWORKING

CURRENT EFFORT: NI-CD VENT CAPS

- **BEFORE:**

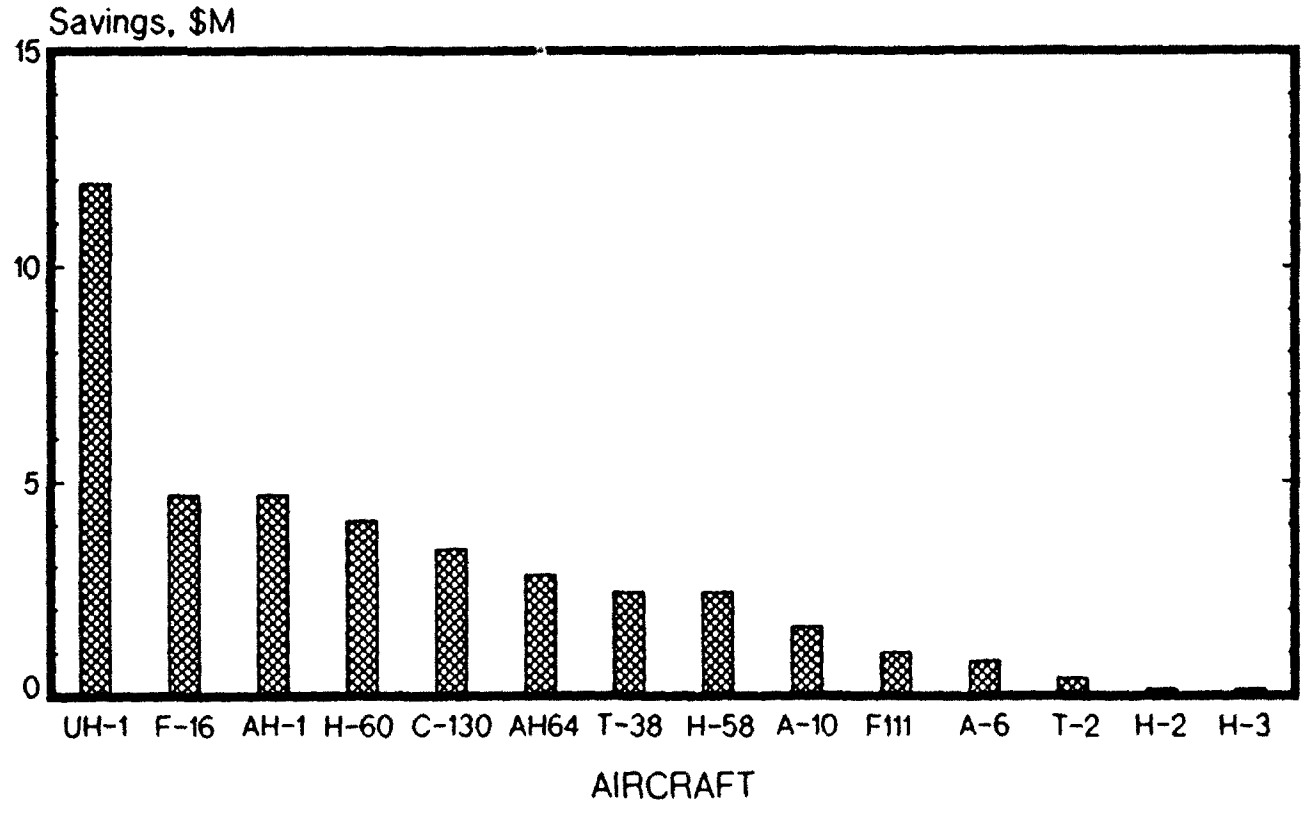
  DIDN'T RETAIN ELECTROLYTE
  DIDN'T EXCLUDE CONTAMINANTS
  DIDN'T VENT PROPERLY

- **AFTER:**

  GENERAL PURPOSE DESIGN
  AEROBATIC DESIGN

- **EFFECT:**
  POTENTIAL COST AVOIDANCE OF $38M / YR

POTENTIAL SAVINGS (DUE TO VENTCAPS)
BY AIRCRAFT



SAVINGS DUE TO REDUCED SCHEDULED AND UNSCHEDULED MAINTENANCE

CURRENT EFFORT: MULTISERVICE PROCUREMENT INITIATIVES

- **PROBLEM:**

  DIFFERENT SERVICES PURCHASE SIMILAR BATTERIES (EX.: 30AH NI-CD, H-60 BATTERIES)

- **SOLUTION:**

  RESOLVE TECHNICAL DIFFERENCES COMBINE PURCHASES OF BATTERIES

BATTERY STANDARDIZATION

- **PROBLEM:**

  UNIQUE SPECS/BATTERIES FOR SYSTEMS

- **SOLUTION:**

  COMBINE EXISTING SPECS
  CONTROL NEW BATTERIES

- **SPEC REVIEW:**

  PRESENT - 16 MAIN ACFT BTRY. SPECS
  FUTURE - 3 MAIN ACFT BTRY. SPECS

- **GUIDE TO PM's AND DESIGNERS FOR BATTERY SYSTEM SELECTION**

  LISTS SPECS, PROVIDES POCs

CURRENT EFFORT:
STANDARD AIRBORNE CHARGER

- WL / ARPA / CHRYSLER COORDINATED
- MODULAR TECHNOLOGY
  ADD PARALLEL MODULES FOR MORE POWER
- TECHNOLOGY DUAL-USE:
  AIRCRAFT & ELEC. VEHICLES
- CHARGER RFP EXPECTED 2ND HALF CY 93
- OPPORTUNITIES:

  CHARGER AND COMPONENTS

CURRENT EFFORT:
NI-CD O&S IMPROVEMENTS

- GOAL: INCREASE MAINTENANCE INTERVAL
- TECHNOLOGY FLIGHT TESTS

  SAFT ULM: UH-1

  EPI SEALED NI-CD: E-8

  ACME FNC: UH-60, AH-64

NOTES

STATE OF CHARGE TECHNOLOGY

MR. JEFFREY SPANGHER
SYSTEMS MANAGEMENT DIRECTORATE
CECOM

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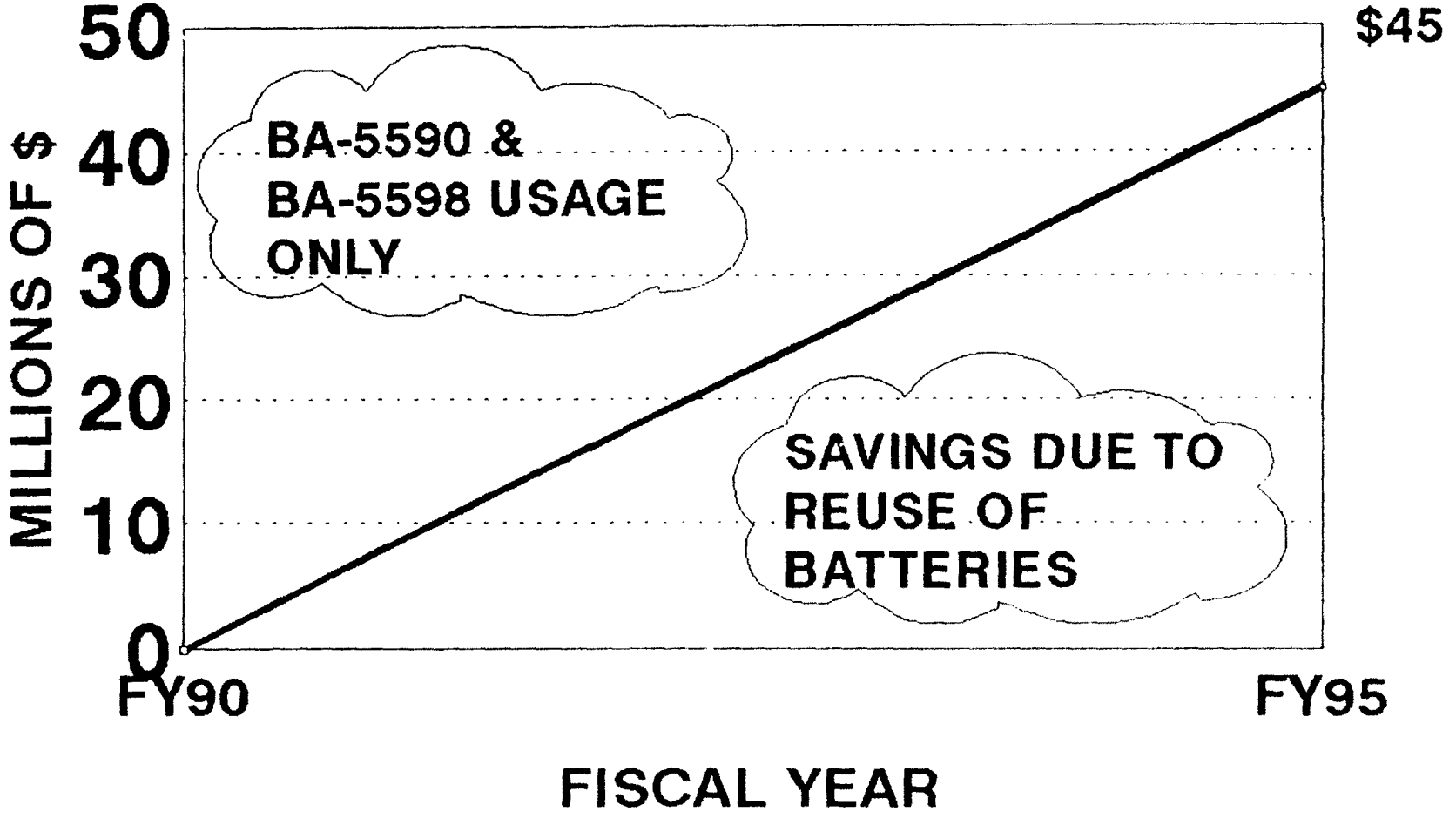
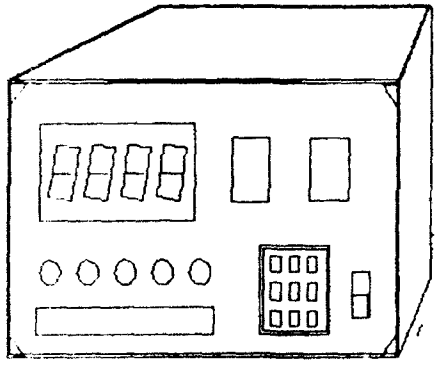
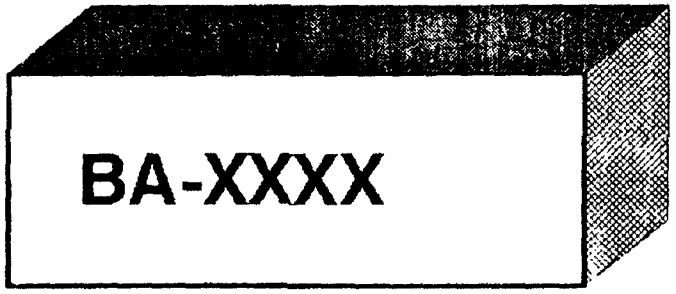
PROJECTED O&S SAVINGS
STATE OF CHARGE METER



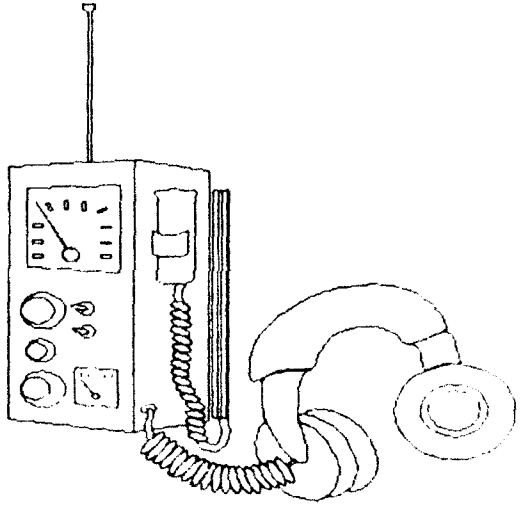
STATE OF CHARGE TECHNOLOGY FORMATS



TS-4403



"SMART BATTERY"



INTERNAL TO END ITEM

STATE OF CHARGE TECHNOLOGY
TS-4403

- MEASURES REMAINING CAPACITY OF BA-5590, BA-5598, BA-5588
- CAPACITY INDICATED IN 10% INCREMENTS
- USER FRIENDLY - BUT REQUIRES REMOVAL OF BATTERY FROM EQUIPMENT
- MUST BE SEPARATELY TRANSPORTED AND MAINTAINED

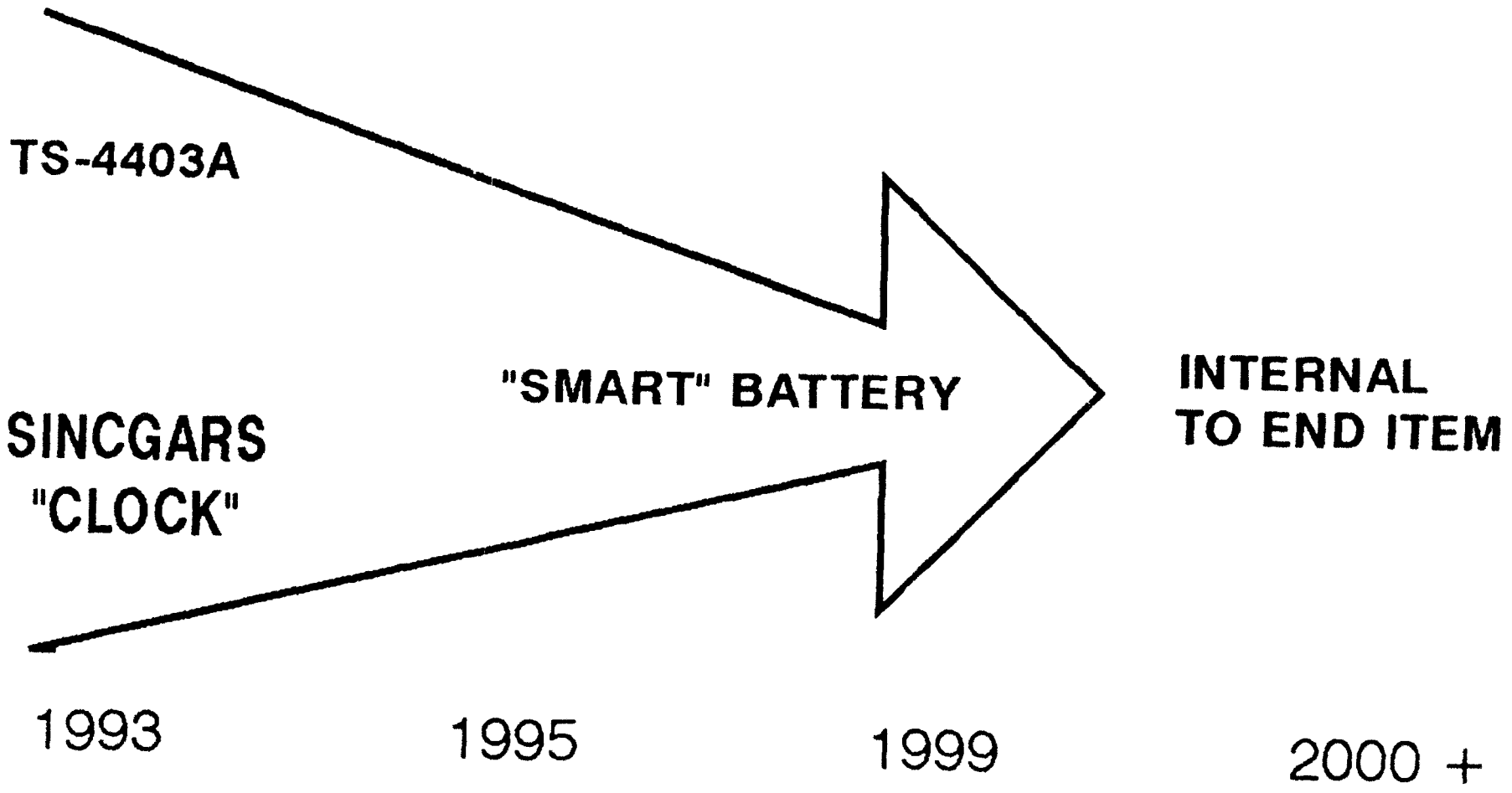
STATE OF CHARGE TECHNOLOGY INTERNAL TO BATTERY

- TWO IDENTIFIED POSSIBILITIES
  - FUEL GAUGE (SIMILAR TO TS-4403A)
  - GO/NO GO LIGHTS
- BOTH REQUIRE ADDITIONAL CIRCUITRY IN BATTERY
- MUST BE COMPATIBLE WITH SOC TECHNOLOGY INTERNAL TO END ITEM
- MUST BE PROVEN COST EFFECTIVE COMPARED TO EXTERNAL METER (TS-4403A) USAGE

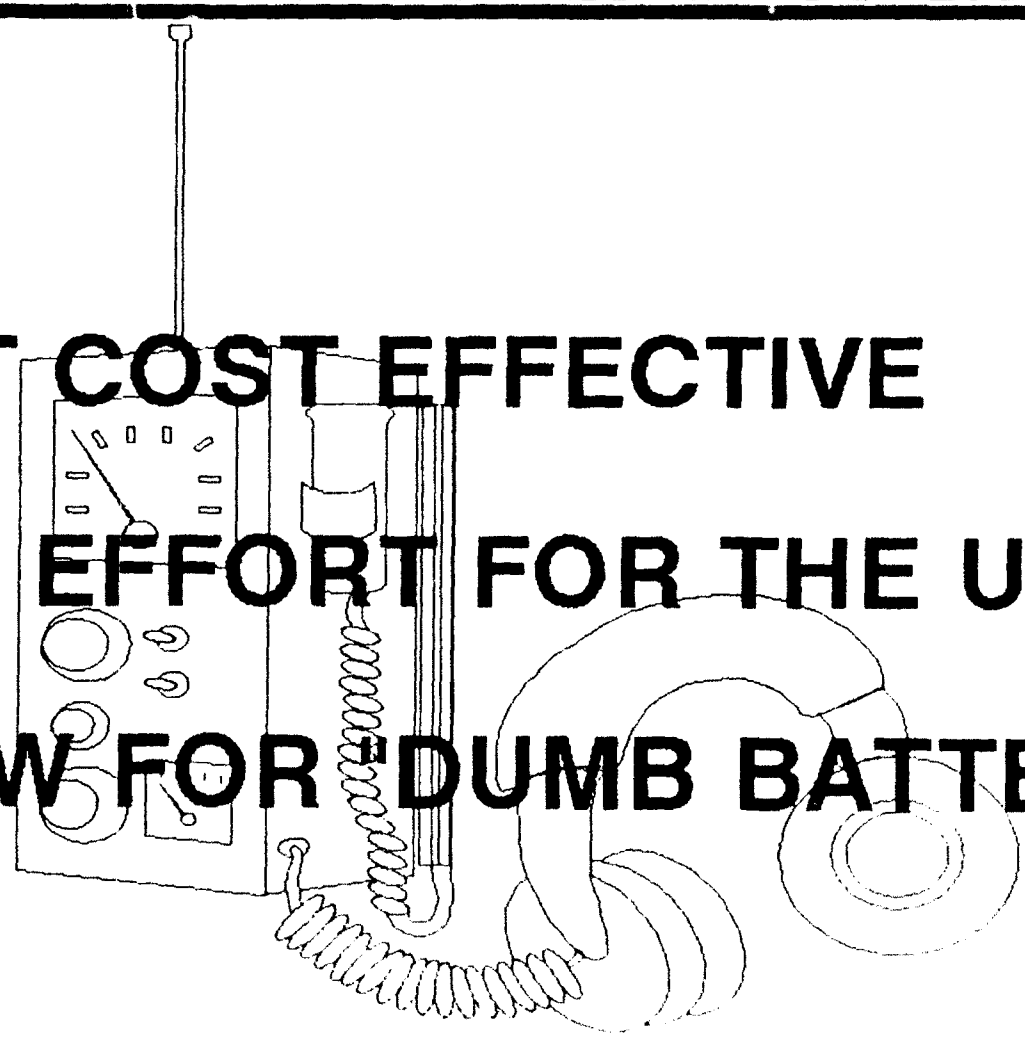
STATE OF CHARGE TECHNOLOGY INTERNAL TO END ITEM

- MOST COST EFFECTIVE
- TWO FORMATS
  - FUEL GAUGE
  - CLOCK
- SINCGARS (CLOCK)
  - ONLY FIELDED INTERNAL TECHNOLOGY
  - ROUGHLY MEASURES BATTERY USE
- "INTERNAL METER" MAY REQUIRE ADDITIONAL CIRCUITRY IN BATTERY
- ZERO EFFORT FOR THE USER

STATE OF CHARGE TECHNOLOGY



ULTIMATE GOAL
INTERNAL TO END ITEM



- MOST COST EFFECTIVE
- ZERO EFFORT FOR THE USER
- ALLOW FOR "DUMB BATTERY"

NOTES

EPA/DISPOSAL ISSUES

Mr. Christopher Kencik
Chief, Environmental Engineering Branch
CECOM Safety Office

UNCLASSIFIED

Environmental Requirements

- Federal Environmental Laws
  - Resource Conservation and Recovery Act (RCRA) - 1976
  - Pollution Prevention Act (PPA) - 1990

- Army Program
  - AR 200-1, Environmental Protection and Enhancement
  - AR 70-1 (Interim), Army Acquisition Process
  - Hazardous Waste Minimization (HAZMIN) Program

Pollution Prevention

- RCRA:
  - Establishes guidelines/standards
  - Generator requirements, identification, storage, recycling, treatment, and disposal
- PPA: Mandates source reduction in:
  - Manufacturing process
  - Equipment life cycle
- Army Implementation
  - AR 200-1
  - AR 70-1
  - HAZMIN Program

Army Program Objective

- Minimize adverse effects on:
  - Personnel
  - Safety and health
  - Environment
- Economically utilize resources
- Ensure compliance with regulations
  - Federal Facilities Compliance Act - 1992

Cost Reduction

- Through Hazardous Waste (HW) Reduction:
  - Material selection
  - Battery design
  - Design for recycling
  - Design components for reuse
  - Rechargeable batteries

DoD Disposal Costs for HW

- BA-5590/U batteries:
  - Annual procurement costs: $8.6M
  - Estimated disposal Costs: $2.4M

Sample Disposal Cost Comparison

- Disposal of lithium batteries at Ft. Monmouth as HW = $220K/year
- Disposal of lithium batteries at Ft. Monmouth as Non-hazardous Solid Waste (NHSW) =$ 75K/year
- SAVINGS =$145K/year

Needs

- In order to :
  - Reduce disposal costs
  - Minimize hazardous and solid waste

- Batteries should be:
  - Environmentally friendly
  - Easy to dispose
  - Removed from waste stream

Future Requirements

- Hazardous Waste:
  - Bioassay (e.g., California)
- Reduction of hazardous materials utilized in batteries
- Design for recycling (40 CFR 273)
  - Increased state requirements (e.g., New Jersey)
- Design components for reuse

NOTES

COMMERCIAL BATTERIES

Mr. Richard O. Banyard
Chief, CCS/Avionics Division
Product Integrity and Production Engineering

UNCLASSIFIED

COMMERCIAL BATTERIES
PROBLEM

MERCURY & CARBON-ZINC BATTERIES NO LONGER SUITABLE FOR THE ARMY

MERCURY BATTERIES

- ENVIRONMENTALLY EXPENSIVE
  - MANUFACTURE
  - DISPOSAL
- DECLINING AVAILABLILTY
- POOR PERFORMANCE
  - LOW TEMPERATURE OPERATION
  - SHELF LIFE
  - WEIGHT

MERCURY BATTERIES
TODAY

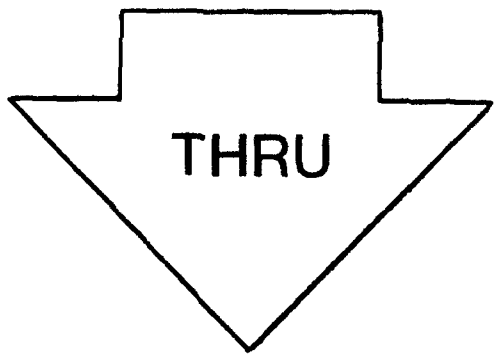
- CHARACTERISTICS
  - UNIQUE LOW CELL VOLTAGE
  - FLAT DISCHARGE VOLTAGE
  - RELATIVELY HIGH ENERGY DENSITY
- POSSIBLE ALTERNATIVES
  - ALKALINE
  - LITHIUM/MANGANESE DIOXIDE
  - OTHER CHEMISTRIES

MERCURY BATTERIES
GOAL

ELIMINATE MERCURY BATTERIES

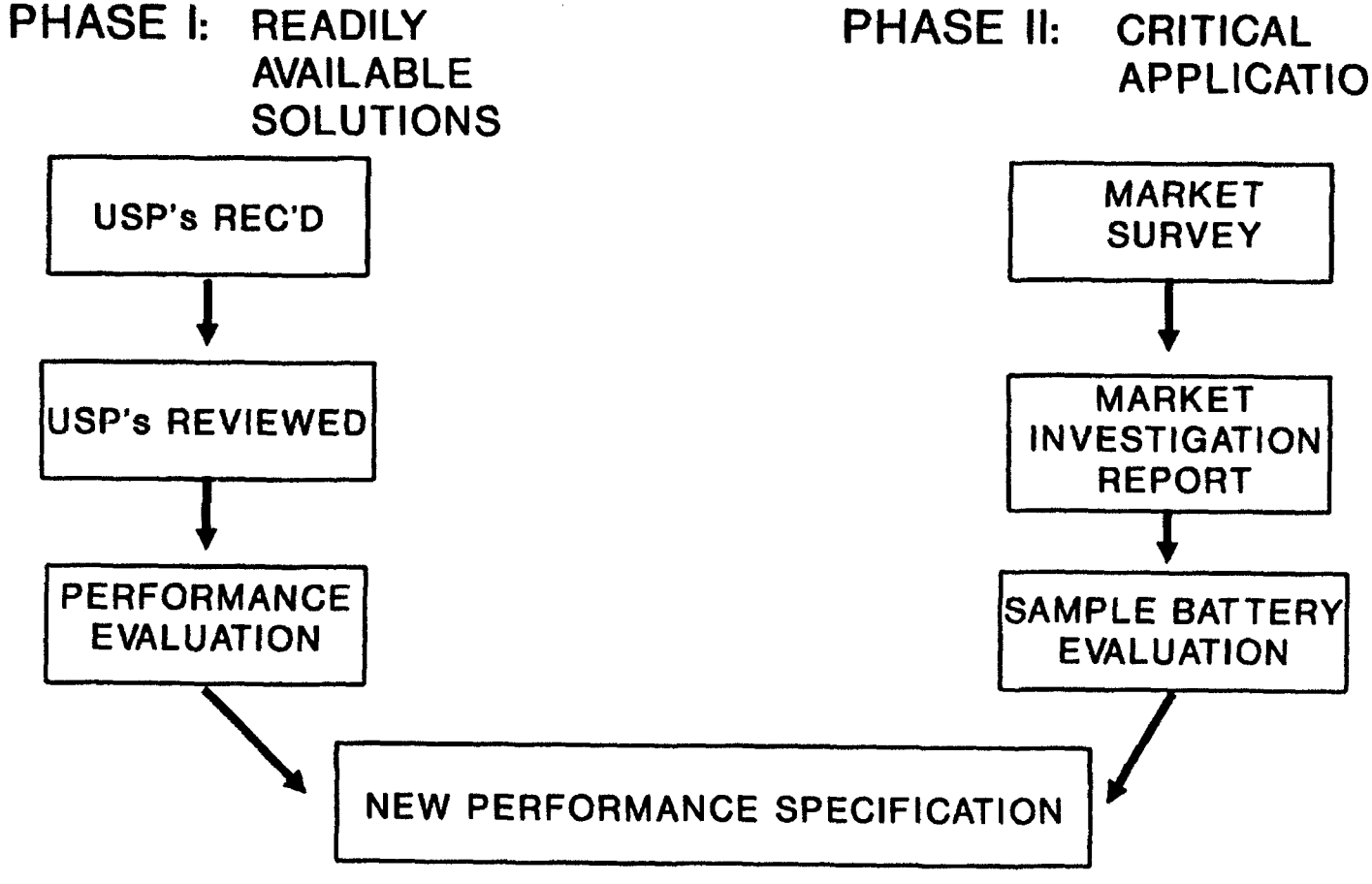
MERCURY BATTERIES
OBJECTIVES

- AT LEAST ONE SOLUTION PER BATTERY
- LOWER DISPOSAL COST
- REDUCED ENVIRONMENTAL IMPACT
- IMPROVED SHELF LIFE



WORKING WITH INDUSTRY

MERCURY BATTERIES
ELIMINATION PROCESS



PHASE III: ALL OTHER MERCURY BATTERIES

MERCURY BATTERIES
PHASE I BATTERIES

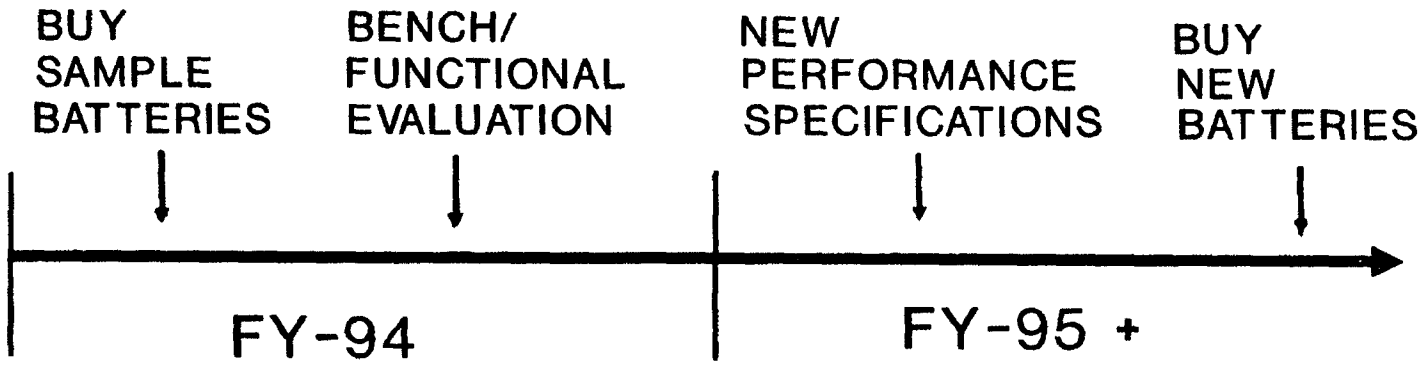
BATTERIES	REPLACEMENTS
BA-1006/U	Alkaline
BA-1318/U	Alkaline
BA-1363/U	Alkaline
BA-1372/U	Alkaline *
BA-1100/U	Alkaline (Under Evaluation)

* Lithium/Mn02 exist also (BA-5372)

MERCURY BATTERIES
PHASE II BATTERIES

BATTERY	VOLTS	BATTERY	VOLTS
BA-1396/U	5.40	BA-1006/U	1.35
BA-1288/U	1.35	BA-1312/U	1.35
BA-1533/U	2.70	BA-1098/U	4.05
BA-1106/U	4.05	BA-1373/U	2.70
BA-1574/U	5.40	BA-1105/U	1.35
BA-1568/U	13.50	BA-1425/U	1.35
BA-1318/U	1.35	BA-1093/U	8.10
BA-1389/U	10.80	BA-1086/U	12.15
BA-1328/U	1.35	BA-1087/U	4.05
BA-1090/U	8.40	BA-1393/U	13.50

MERCURY BATTERIES
TIMELINE



CARBON-ZINC BATTERIES

TODAY

- SOME CELLS NO LONGER PRODUCED
- POOR SHELF LIFE
- LOW CAPACITY
- POOR LOW TEMPERATURE PERFORMANCE
- FIELD CONFUSED

CARBON - ZINC BATTERIES

SOLUTION

- ALKALINE REPLACEMENTS
- SAME ENVELOPE AND CONNECTOR REQUIREMENTS
- IMPROVED CAPACITY

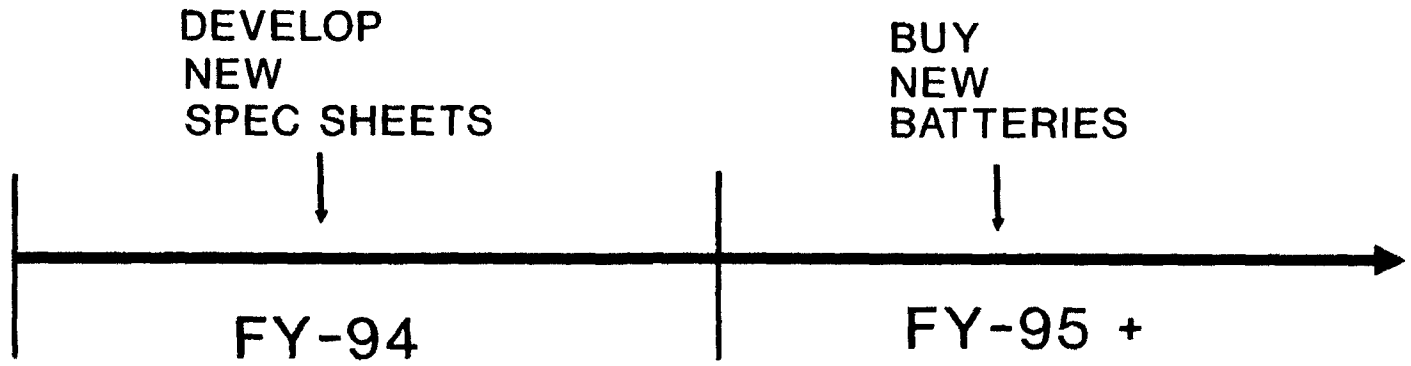
CARBON-ZINC BATTERIES
CURRENT LISTING

CECOM CARBON-ZINC BATTERIES

BATTERY	VOLTS
BA-15A	1.5
BA-41/U	60/30/25.5/4.5
BA-44/U	6.0
BA-63/U	45/22.5
BA-200/U	6.0
BA-225/U	3.0
BA-261/U	22.5
BA-270/U	90/45/1.5/-4.5
BA-305/U	30.0
BA-310/U	6.0
BA-332/U	15.0
BA-334/U	30.0

BATTERY	VOLTS
BA-411/U	6/4.5/3/1.5
BA-417/U	22.5
BA-471/U	7.5/6/1.5
BA-803/U	6.0
BA-804/U	7.5
BA-806/U	45.0
BA-808/U	7.5
BA-811/U	9.0
BA-813/U	7.5/4.5
BA-815/U	6.0
BA-818/U	13.5

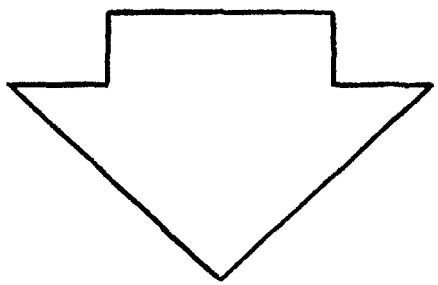
CARBON-ZINC BATTERIES
TIMELINE



MERCURY & CARBON-ZINC BATTERIES
SUMMARY

REPLACE MERCURY & CARBON-ZINC BATTERIES TO REDUCE COSTS FOR

- PURCHASING
- STORAGE
- DISPOSAL
- INVENTORY



AFFORDABILITY

NOTES

POWER SUPPLIES AND BATTERY CHARGERS

Mr. Richard O. Banyard
Chief, CCS/Avionics Division
Product Integrity and Production Engineering

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POWER SUPPLIES AND BATTERY CHARGERS

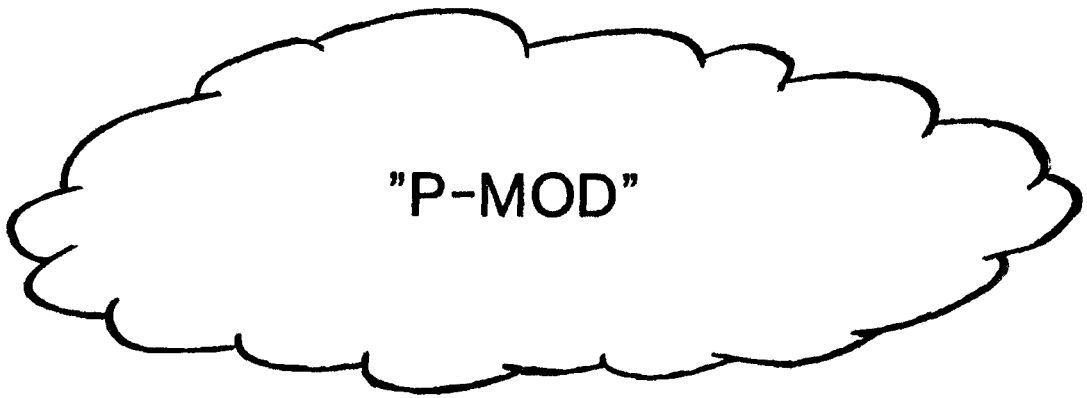
TODAY

- OLD TECHNOLOGY
- HEAVY
- EXPENSIVE TO BUY AND MAINTAIN
- OVERLAPPING CAPABILITY
- CAN'T TAKE ADVANTAGE OF STATE OF THE ART

POWER SUPPLIES AND BATTERY CHARGERS

NEED

POWER SUPPLY MODERNIZATION



POWER SUPPLY MODERNIZATION

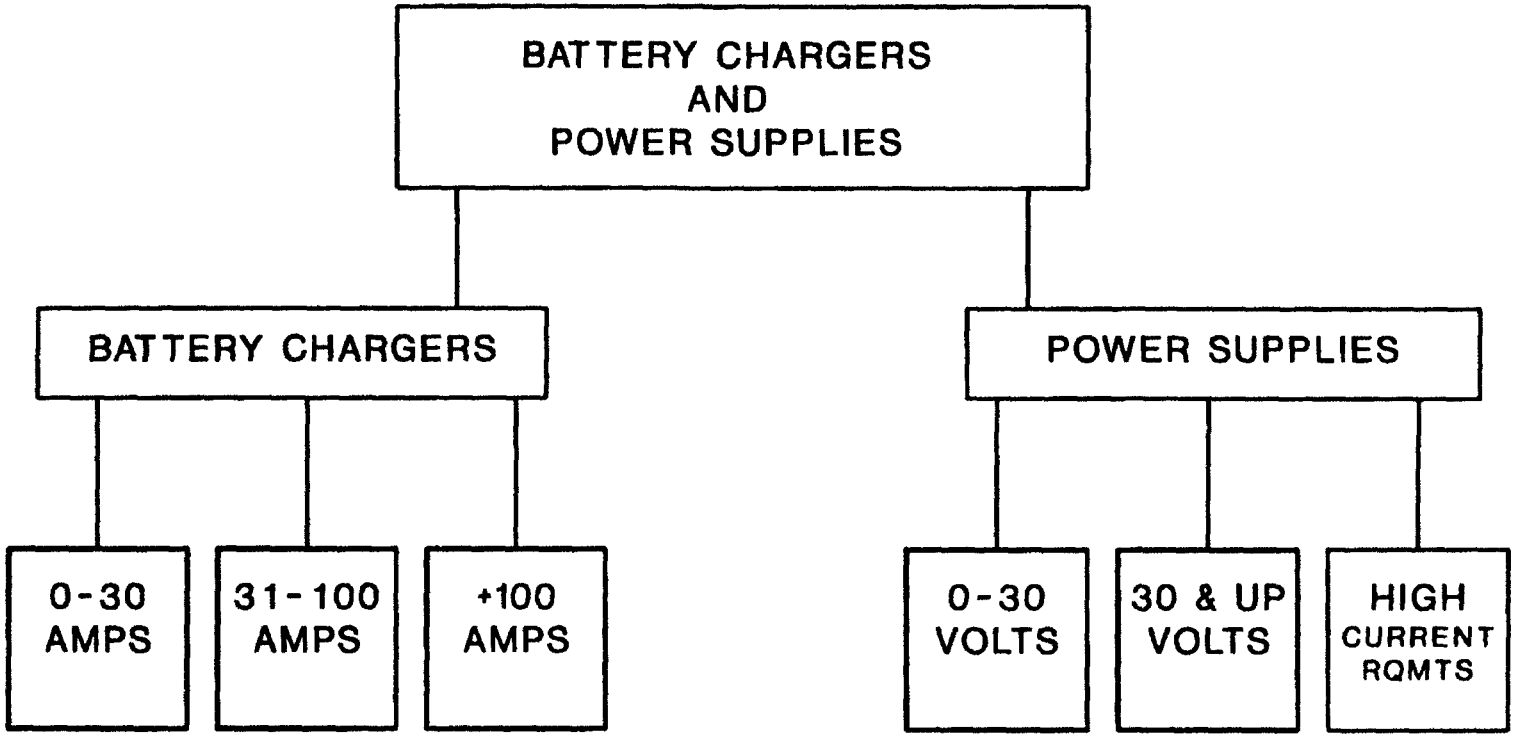
TOMORROW

- ELIMINATE AGING DESIGNS FROM INVENTORY
- REDUCE OVERLAP BETWEEN TYPES
- USE MODIFIED COMMERCIAL
- SWITCH TO PERFORMANCE SPECIFICATIONS

"BETTER FOR CHEAPER"

POWER SOURCES MODERNIZATION

APPROACH



REDUCE 17 ITEMS TO AS FEW AS 6

POWER SOURCES MODERNIZATION
POSSIBLE EQUIPMENT GROUPS

CHARGERS

0 - 30 Amps	30 - 100 Amps	+ 100 Amps
PP-6241	PP-34	PP-2926
PP-7286	PP-1659	
PP-6259	PP-1660	

POWER SUPPLIES

0 - 30 Volts	30+ Volts	High Current
PP-2953	PP-2309	PP-4606
PP-6148	PP-3940	
PP-3514	PP-7545	
PP-6224		
PP-1104		
PP-4763		

POWER SOURCES MODERNIZATION
EQUIPMENT COMPARISON EXAMPLE

Today

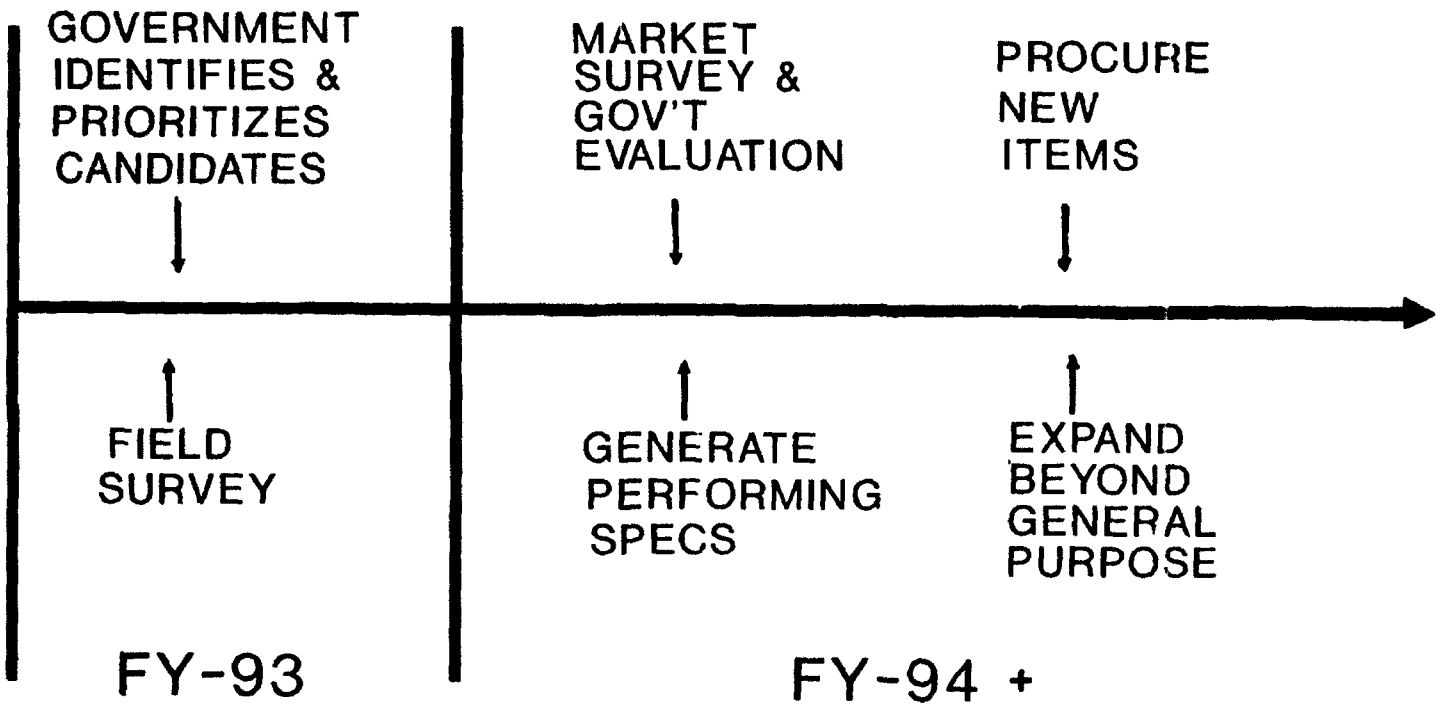
EQUIPMENT	INPUT	OUTPUT		ENVIRONMENTS
		VDC	AMPS	
PP-2309	115/230 VAC 47-63Hz	2-36	0-15	SHELTERS SHOPS
PP-3946	115 VAC 47-420Hz	0-40	0-6	60 F - 100 F
Tomorrow PP-XXXX	115/230 VAC 47-420Hz	0-40	0-15	AMBIENT

POWER SOURCES MODERNIZATION
EQUIPMENT COMPARISON EXAMPLE

Today

EQUIPMENT	INPUT	OUTPUT VDC	OUTPUT AMPS	ENVIRONMENTS
PP-1659	115 VAC	2-30	0-50	VAN
PP-1660	115 VAC	6/14/24	75/75/40	PORTABLE
Tomorrow PP-YYYY	115 VAC	12/24	30-75	MOD OTS PORTABLE

POWER SOURCES MODERNIZATION
TIMELINE



POWER SOURCES MODERNIZATION
BOTTOM LINE

ARMY POWER SOURCES THAT ARE:

- SAFE
- INEXPENSIVE
- MEETS CURRENT MISSION NEEDS
- STATE-OF-THE-ART

"BETTER FOR CHEAPER"

NOTES

SESSION III

END ITEM POWER MANAGEMENT

POWER DESIGN CONSIDERATIONS FOR SINCGARS FIELD REALITIES OF BATTERIES

Mr. DOUG ANTISELL
CHIEF, CONFIGURATION CONTROL BRANCH
PM SINCGARS

UNCLASSIFIED

FIELD REALITIES OF BATTERIES
OUTLINE

- SINCGARS MANPACK REQUIREMENTS
- FIELD REALITIES
- BATTERY COST SAVINGS MEASURES
- SINCGARS/INDUSTRY CHALLENGES

SINCGARS MANPACK REQUIREMENTS

- 24 HOUR CONTINUOUS OPERATION
- LESS THAN 20 POUNDS WEIGHT
- HIGH/LOW TEMPERATURE OPERATION
- 4 WATTS TRANSMIT POWER AT THE ANTENNA

FIELD REALITIES

LITHIUM IS THE ONLY

AVAILABLE BATTERY TECHNOLOGY

THAT MEETS THE

SINCGARS MISSION REQUIREMENTS

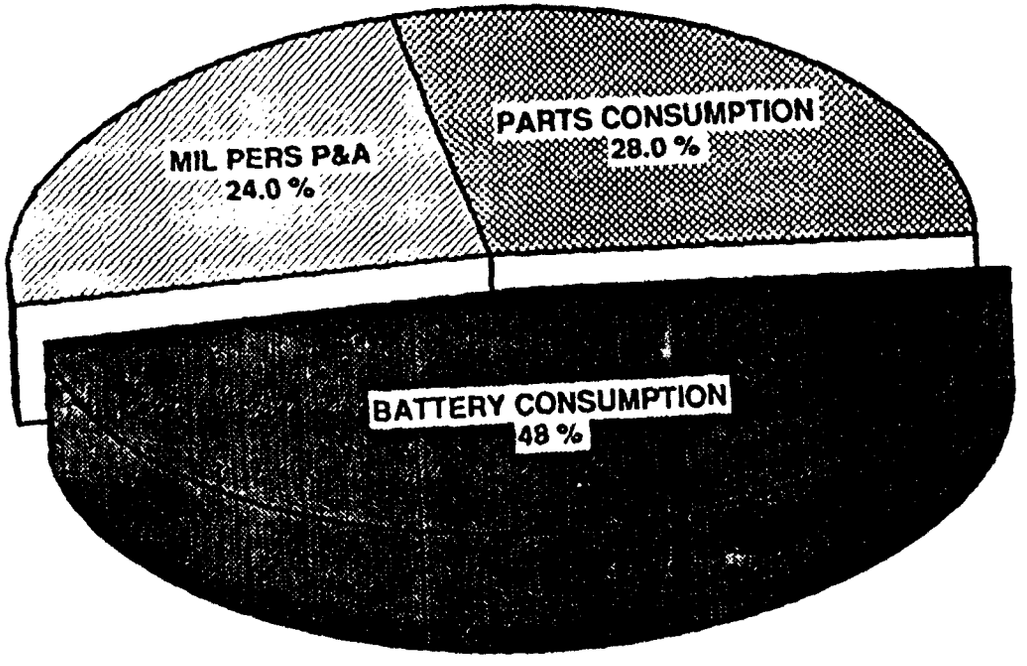
FIELD REALITIES

WEIGHT

BATTERIES ARE 12% OF MANPACK WEIGHT

FIELD REALITIES

O&S COSTS



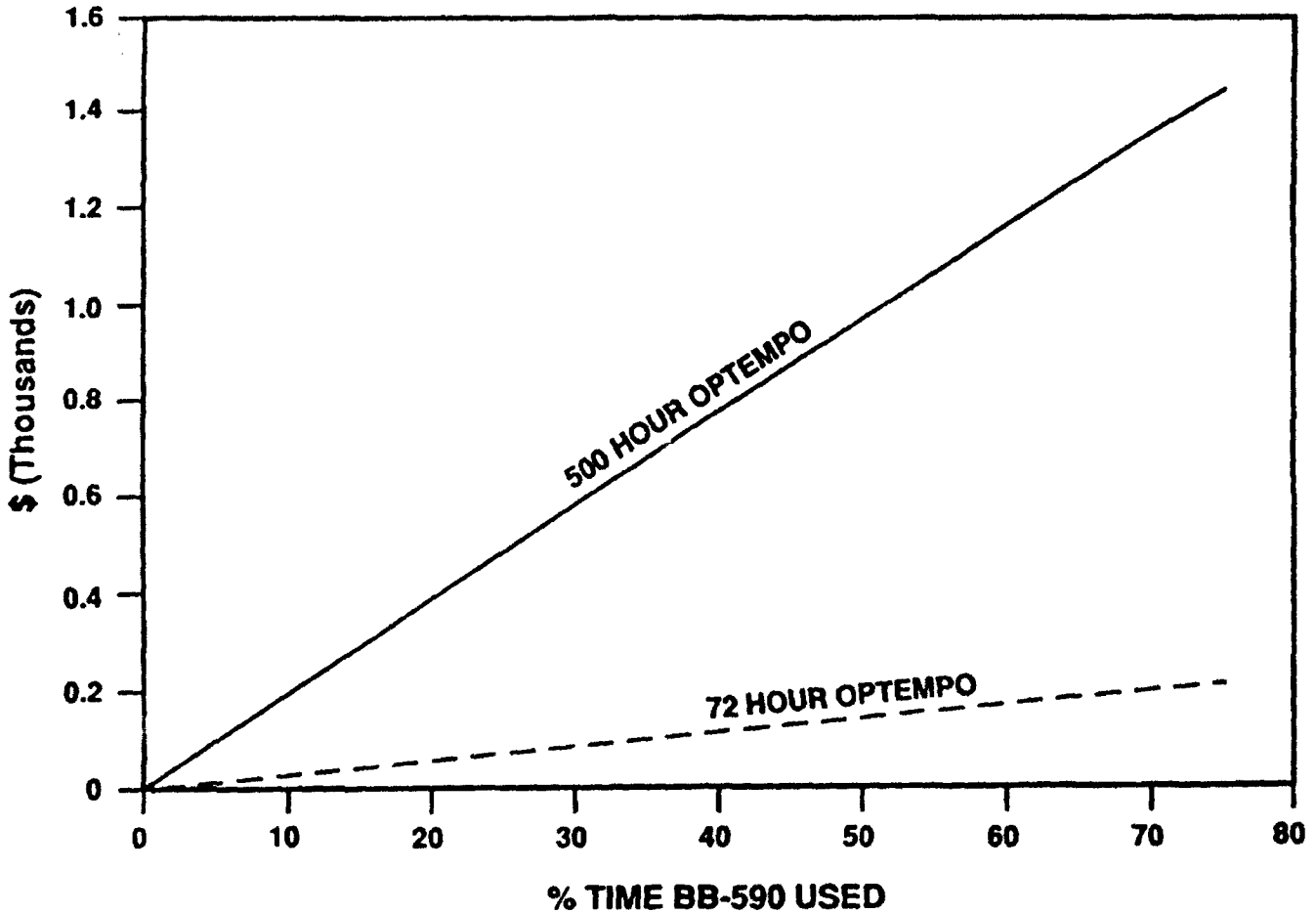
BATTERY CONSUMPTION REPRESENTS 48% OF THE O&S COSTS

BATTERY COST SAVINGS MEASURES

- USE RECHARGEABLE BATTERIES
- BATTERY MANAGEMENT
- USE STATE OF CHARGE METER
- FIELDING CONSIDERATIONS
- RADIO IMPROVEMENTS

BATTERY COST SAVINGS MEASURES

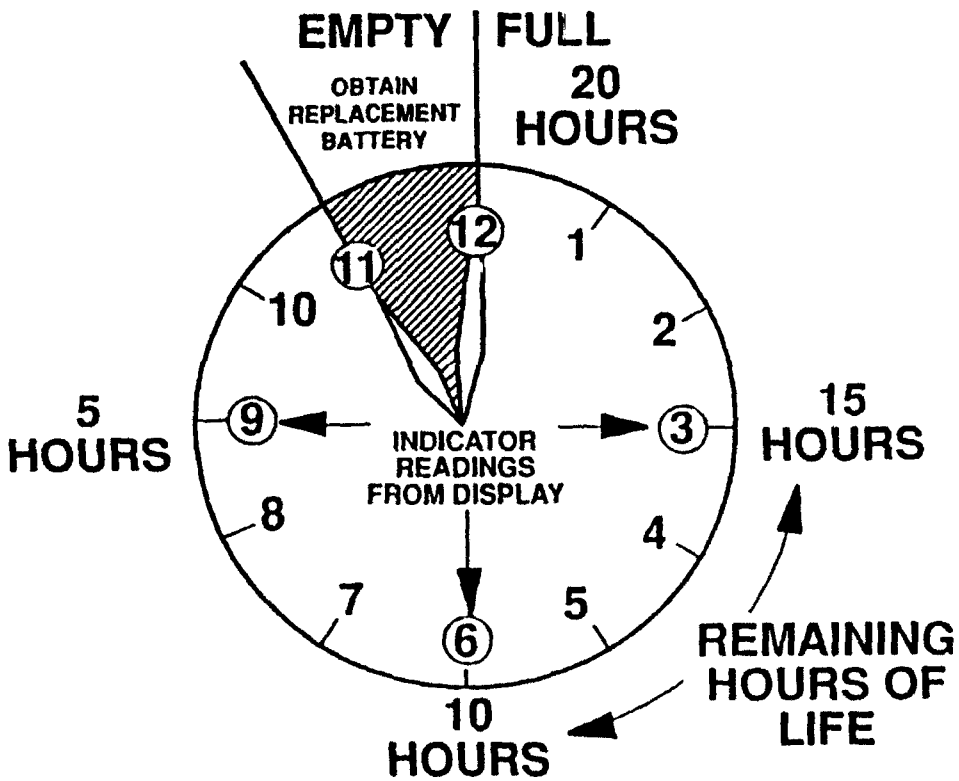
RECHARGEABLE BATTERIES



PROJECTED SAVINGS OF RECHARGEABLE BATTERIES WITHIN LIGHT INFANTRY DIVISION

BATTERY COST SAVINGS MEASURES

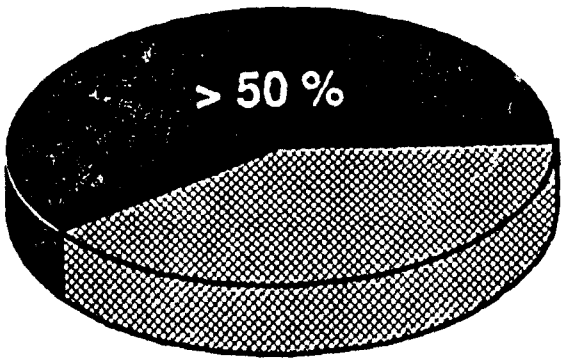
BATTERY MANAGEMENT



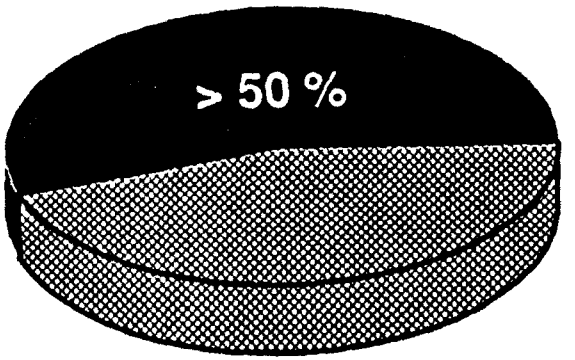
RT MEASURES TIME USING ACTUAL DUTY CYCLE

BATTERY COST SAVINGS MEASURES

SAMPLE DATA COLLECTION
CAPACITY REMAINING IN
BATTERIES SLATED FOR DISPOSAL



BA-5590/U
FORT BRAGG



BA-5590/U
FORT LEWIS

MORE THAN 1/2 THE BATTERIES TESTED HAD > 50 % CAPACITY LEFT

BATTERY COST SAVINGS MEASURES

FIELDING CONSIDERATIONS

GIVE COMMANDERS FLEXIBILITY

TO SELECT BEST MIX OF BATTERIES

BATTERY COST SAVINGS MEASURES
RADIO IMPROVEMENTS

- ELECTRICAL DESIGN CHANGES
  - 5.7 VDC BACKPLANE POWER DISTRIBUTION
  - ICOM POWER SUPPLY REGULATION
  - ASIC TECHNOLOGY IMPLEMENTATION
  - IMPROVE RT POWER SUPPLY EFFICIENCY (65 to 79%)
  - REDUCE PARTS COUNT
  - ACTIVE DUTY CYCLE (1:3:6) & IDLE MODE

- BENEFITS
  - 28% IMPROVEMENT IN BATTERY LIFE (25 to 32 hrs)
  - 17% REDUCTION IN MANPACK WEIGHT (19 to 16 lbs)

SINCGARS/INDUSTRY CHALLENGES

- LOW POWER COMPONENTS
- LIGHTER BATTERIES
- LOW COST MONITORING
- LONG LIFE RECHARGEABLE BATTERIES
- LOW COST BA-5590 REPLACEMENT

SINCGARS/INDUSTRY CHALLENGES
LOW POWER COMPONENTS

SINCGARS PRIME CONTRACTORS
DESIGNING LOW POWER CIRCUITRY

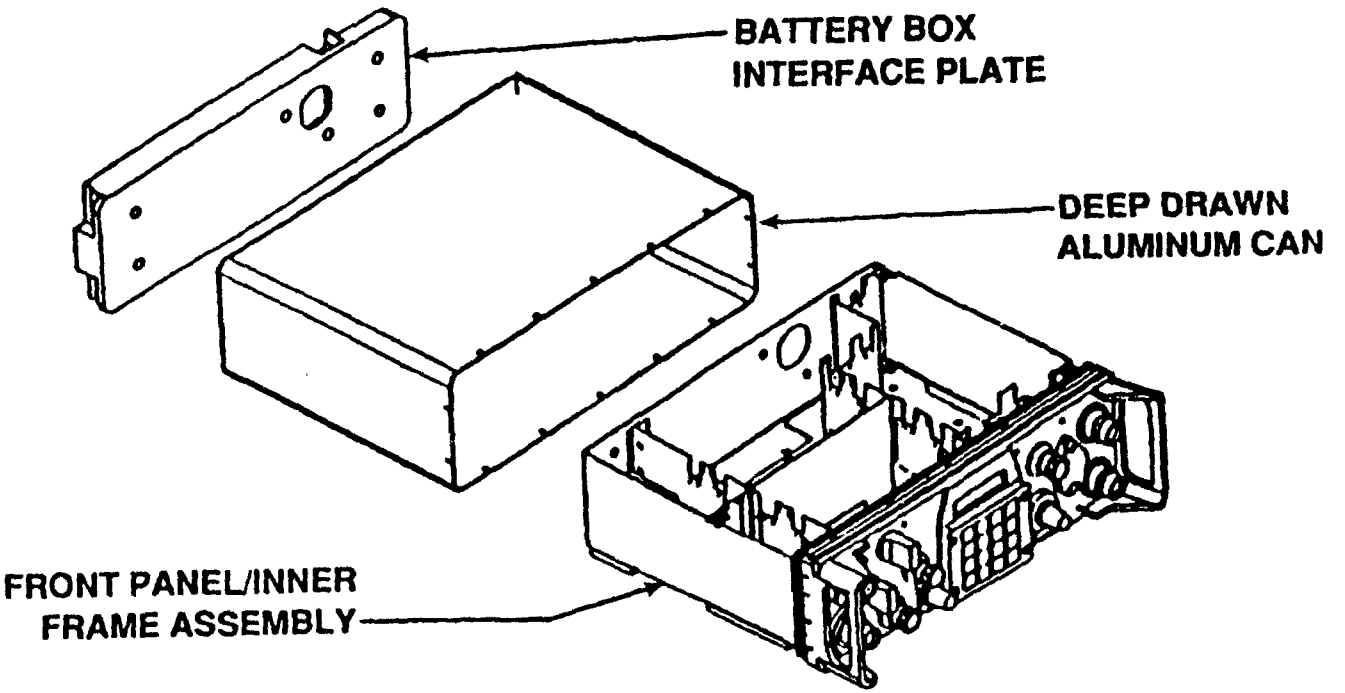
LOW POWER COMPONENTS ARE NEEDED FROM VENDOR BASE

SINCGARS/INDUSTRY CHALLENGES

WEIGHT

RT WEIGHT CAN BE REDUCED WITH MODEST DESIGN CHANGES

- MECHANICAL CHANGES ONLY
- NO MODULE CHANGES



LIGHTER BATTERIES FROM SUPPLIERS

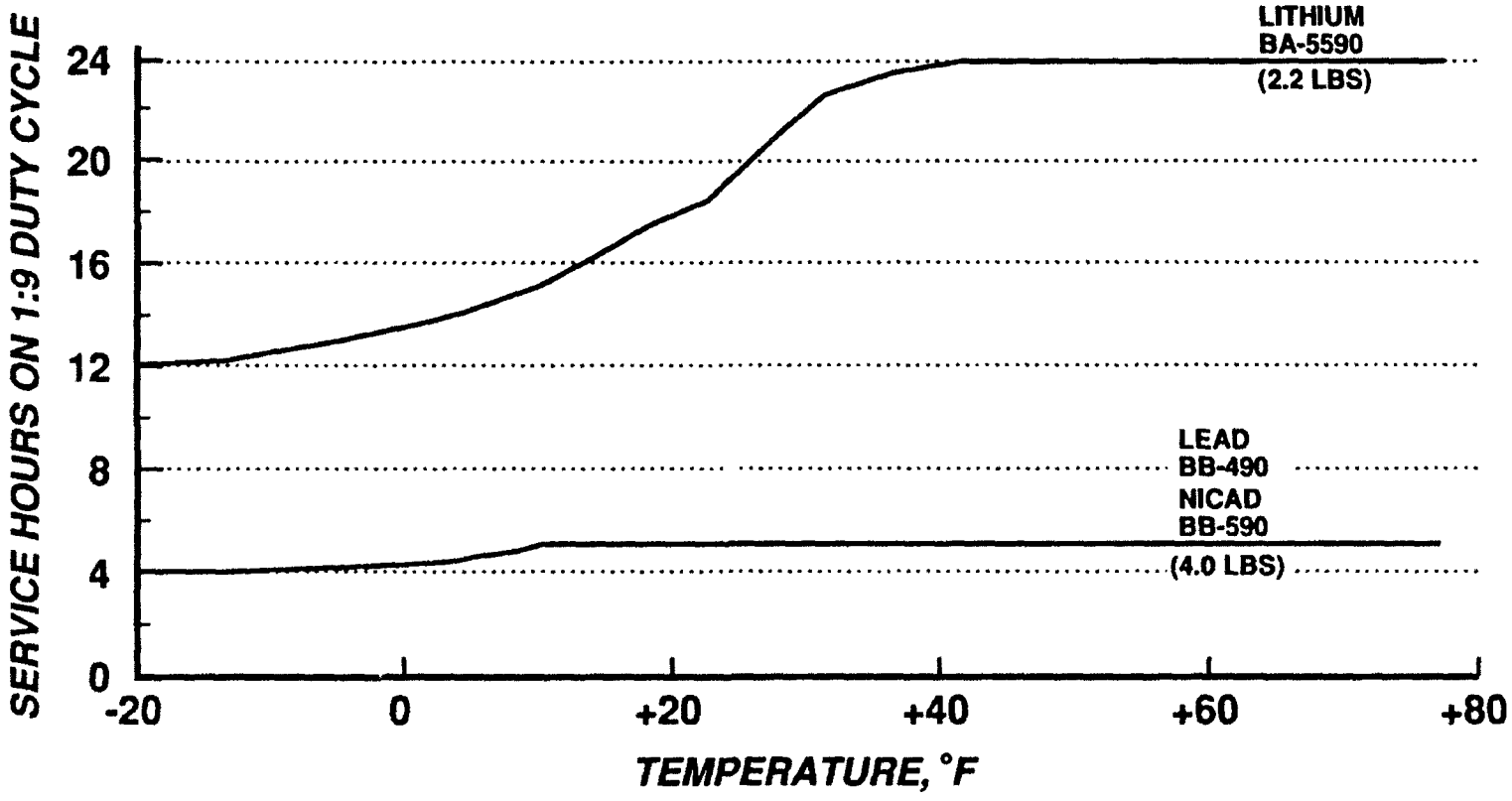
SINCGARS/INDUSTRY CHALLENGES
BATTERY MONITORING

- RADIOS PROVIDE FOR INTERNAL BATTERY MONITORING
- WILL PROVIDE INTERFACE WITH EXTERNAL MONITORING DEVICE

LOW COST MONITORING DEVICES NEEDED FROM INDUSTRY

SINCGARS/INDUSTRY CHALLENGES

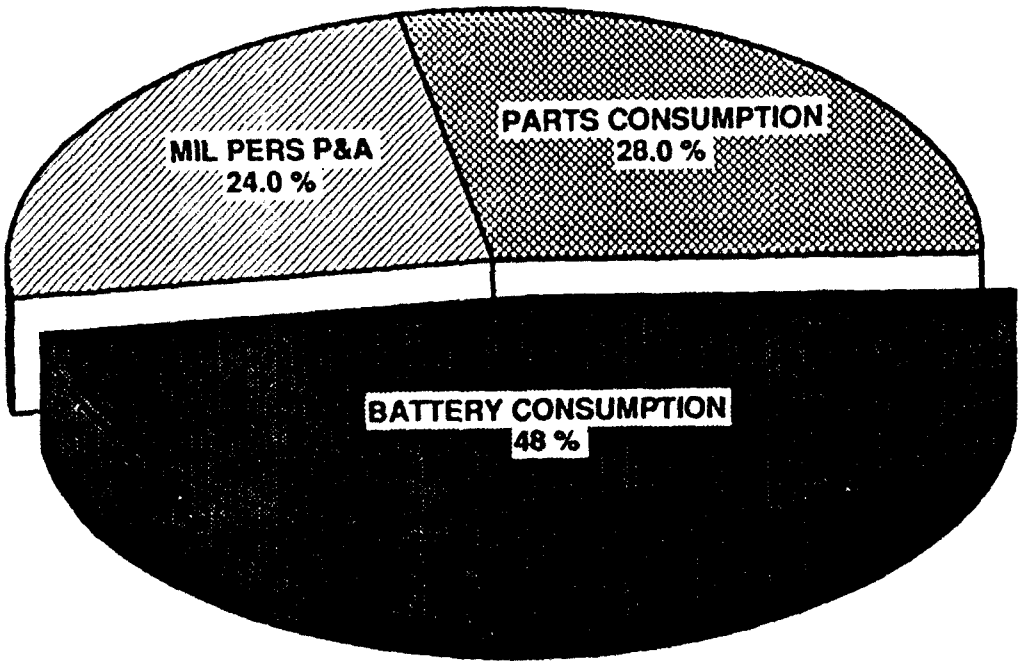
THE FIELD IS USING RECHARGEABLE BATTERIES



LONGER LIFE RECHARGEABLE BATTERIES NEEDED FROM SUPPLIERS

SINCGARS/INDUSTRY CHALLENGES

PM SINCGARS IS WORKING HARD TO REDUCE THE O&S COSTS



LOW COST BATTERY NEEDED FROM SUPPLIERS

NOTES

END ITEM EQUIPMENT DESIGN REQUIREMENTS

PERRY W. HUGO
ELECTRONICS ENGINEER
U.S. ARMY COMMUNICATIONS-ELECTRONICS COMMAND
RESEARCH, DEVELOPMENT & ENGINEERING CENTER

UNCLASSIFIED

END ITEM EQUIPMENT DESIGN REQUIREMENTS

AGENDA

- INTRODUCTION
- EQUIPMENT DESIGN & OPERATIONAL CONSTRAINTS
- LOW POWER EQUIPMENT DESIGN TECHNOLOGY
- RESEARCH, DEVELOPMENT & ACQUISITION EFFORTS
- SUMMARY

END ITEM EQUIPMENT DESIGN REQUIREMENTS

CUSTOMER NEEDS

- USE OF STANDARD ELECTRIC POWER SOURCES
- ENERGY EFFICIENT & LOW POWER EQUIPMENT DESIGNS
- ALTERNATIVE ELECTRIC POWER SOURCES & EQUIPMENT POWER SYSTEM DESIGN METHODS

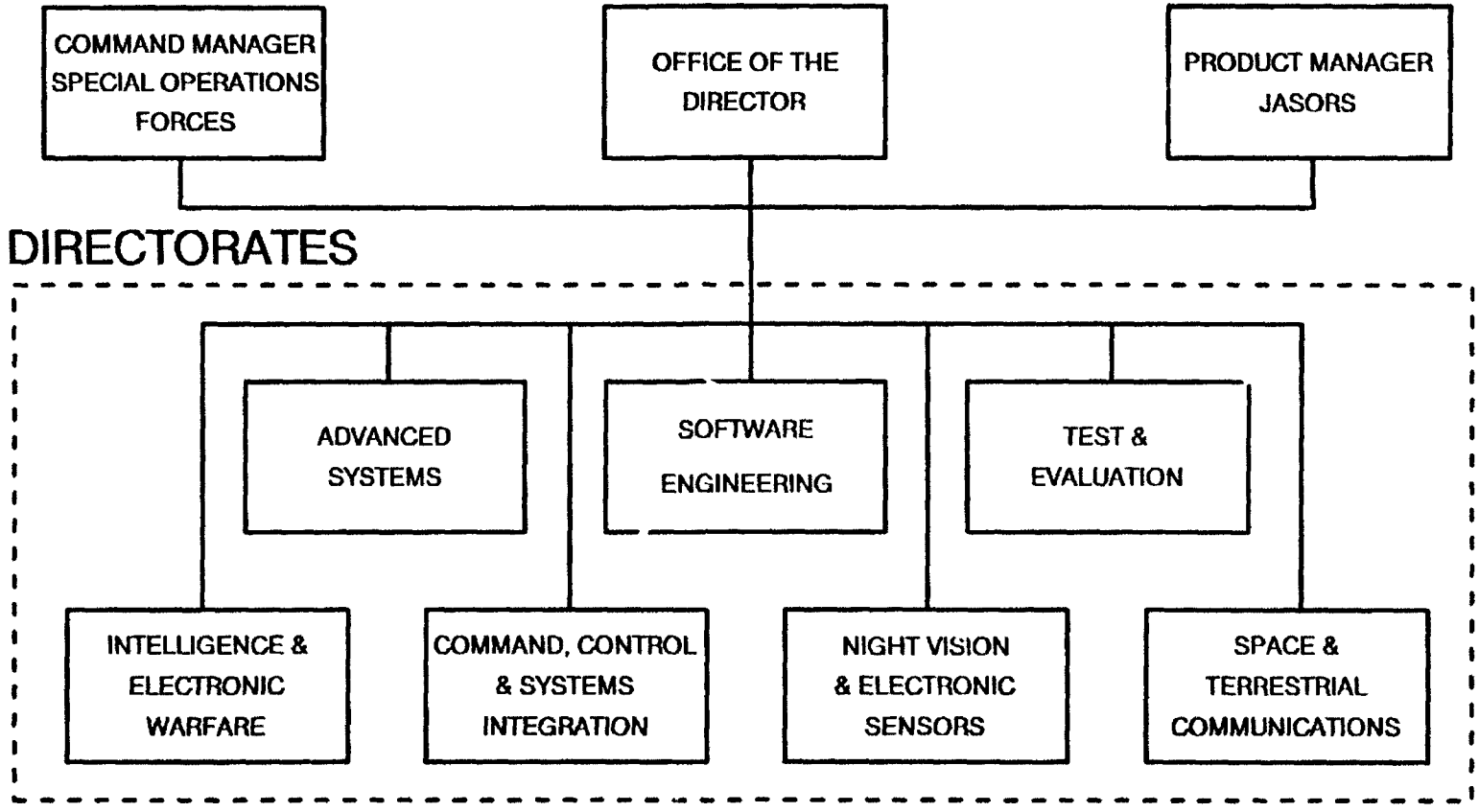
END ITEM EQUIPMENT DESIGN REQUIREMENTS

OBJECTIVES

- C4I EQUIPMENT ENERGY CONSIDERATIONS
  - POWER CONSUMPTION
  - ENERGY EFFICIENCY
  - AVAILABLE POWER SOURCES
- REDUCE POWER DEMAND
- REDUCE PROLIFERATION OF POWER SOURCES
- AVAILABILITY OF POWER SOURCE ALTERNATIVES

END ITEM EQUIPMENT DESIGN REQUIREMENTS

CECOM RDEC ORGANIZATION



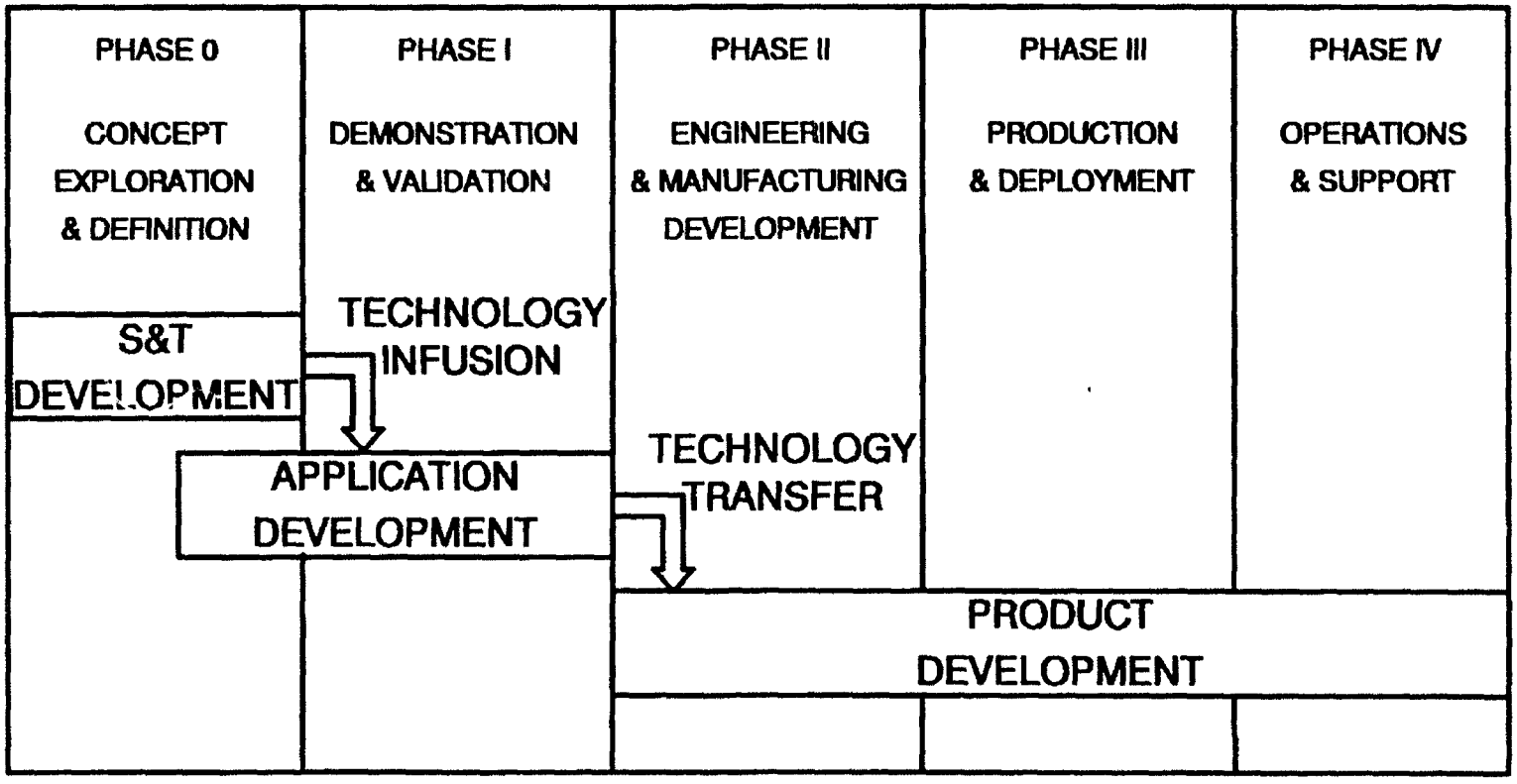
END ITEM EQUIPMENT DESIGN REQUIREMENTS

CECOM RDEC FUNCTIONS

- SCIENCE & TECHNOLOGY BASE SURVEILLANCE
- RESEARCH & DEVELOP MATERIEL SOLUTIONS
- TECHNOLOGY INFUSION INTO APPLICATIONS
- TECHNOLOGY TRANSFER TO PRODUCTS

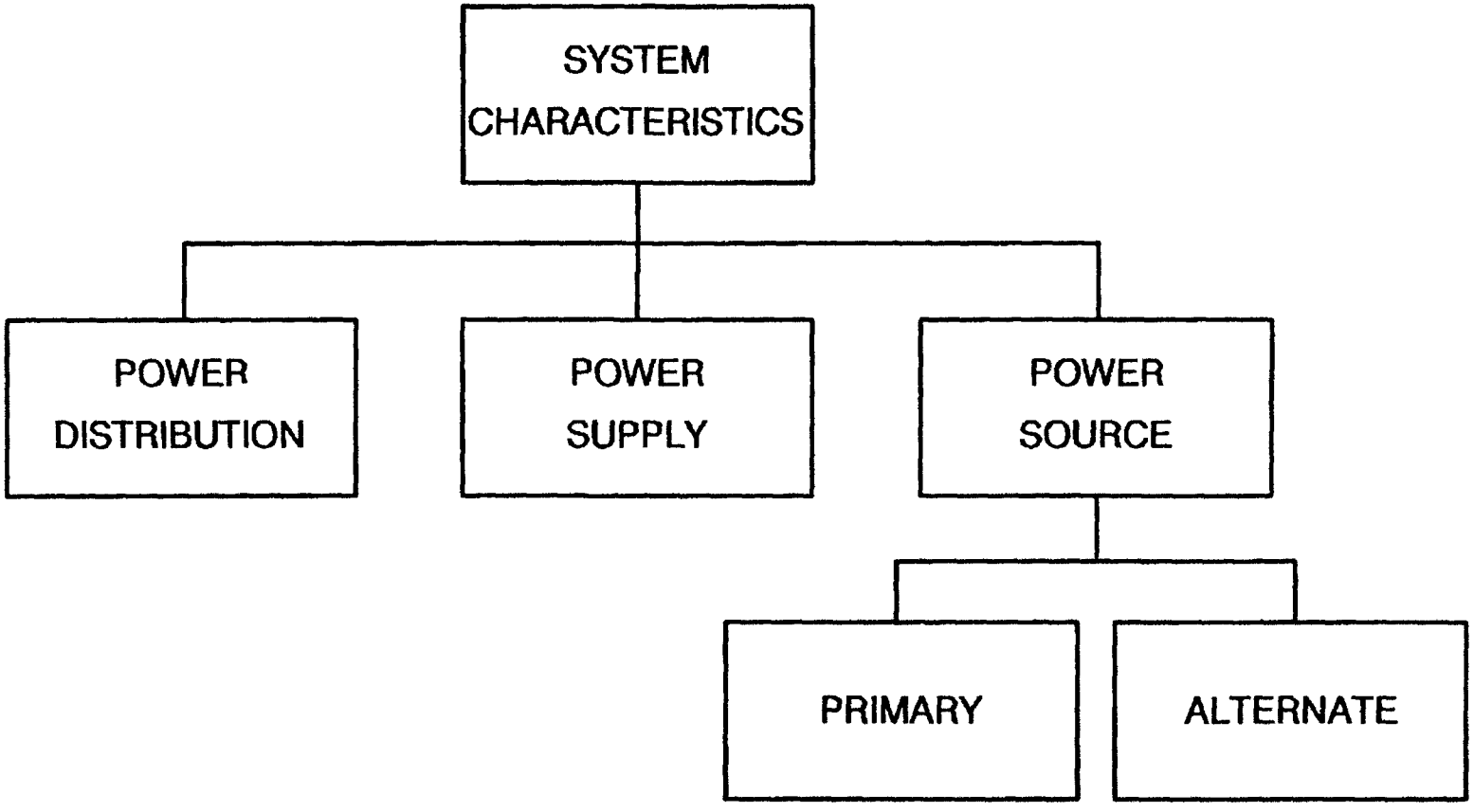
END ITEM EQUIPMENT DESIGN REQUIREMENTS

ACQUISITION LIFE CYCLE



END ITEM EQUIPMENT DESIGN REQUIREMENTS

POWER SYSTEM DESIGN



END ITEM EQUIPMENT DESIGN REQUIREMENTS

OPERATIONAL CONSTRAINTS

- TRANSPORTABILITY
- SURVIVABILITY
- ENERGY NEEDS
- STANDARDIZATION & INTERFACE
- MANPOWER, PERSONNEL & TRAINING
- COMPATIBILITY & INTEROPERABILITY

END ITEM EQUIPMENT DESIGN REQUIREMENTS

LOW POWER EQUIPMENT DESIGN TECHNOLOGY

- ELECTRONIC COMPONENT & DESIGN TECHNOLOGIES
- ELECTRONIC MANUFACTURING & PACKAGING TECHNIQUES
- EQUIPMENT POWER DISTRIBUTION & DISTRIBUTED POWER ARCHITECTURES
- EQUIPMENT LOW POWER DISSIPATION DESIGN TECHNOLOGY
- EQUIPMENT ENERGY CONSERVATION & POWER MANAGEMENT TECHNIQUES

END ITEM EQUIPMENT DESIGN REQUIREMENTS

RESEARCH, DEVELOPMENT & ACQUISITION EFFORTS

- SINGLE CHANNEL ANTI-JAM MANPORTABLE (SCAMP) TERMINAL BLOCK I/II
  Block I POC: Mr. Gary Martin, SFAE-CM-MSA, (908) 532-5232
  Block II POC: Mr. Steve Waugh, AMSEL-RD-ST, (908) 532-2240

- JOINT ADVANCED SPECIAL OPERATIONS RADIO SYSTEM (JASORS)
  POC: Mr. Don Upmal, AMCPM-JA, (908) 532-2044

- INTEROPERABLE POWER ADAPTER & CHARGER
  POC: Mr. Perry Hugo, AMSEL-RD-AS, (908) 544-2022

SINGLE CHANNEL ANTI-JAM MANPORTABLE (SCAMP) TERMINAL

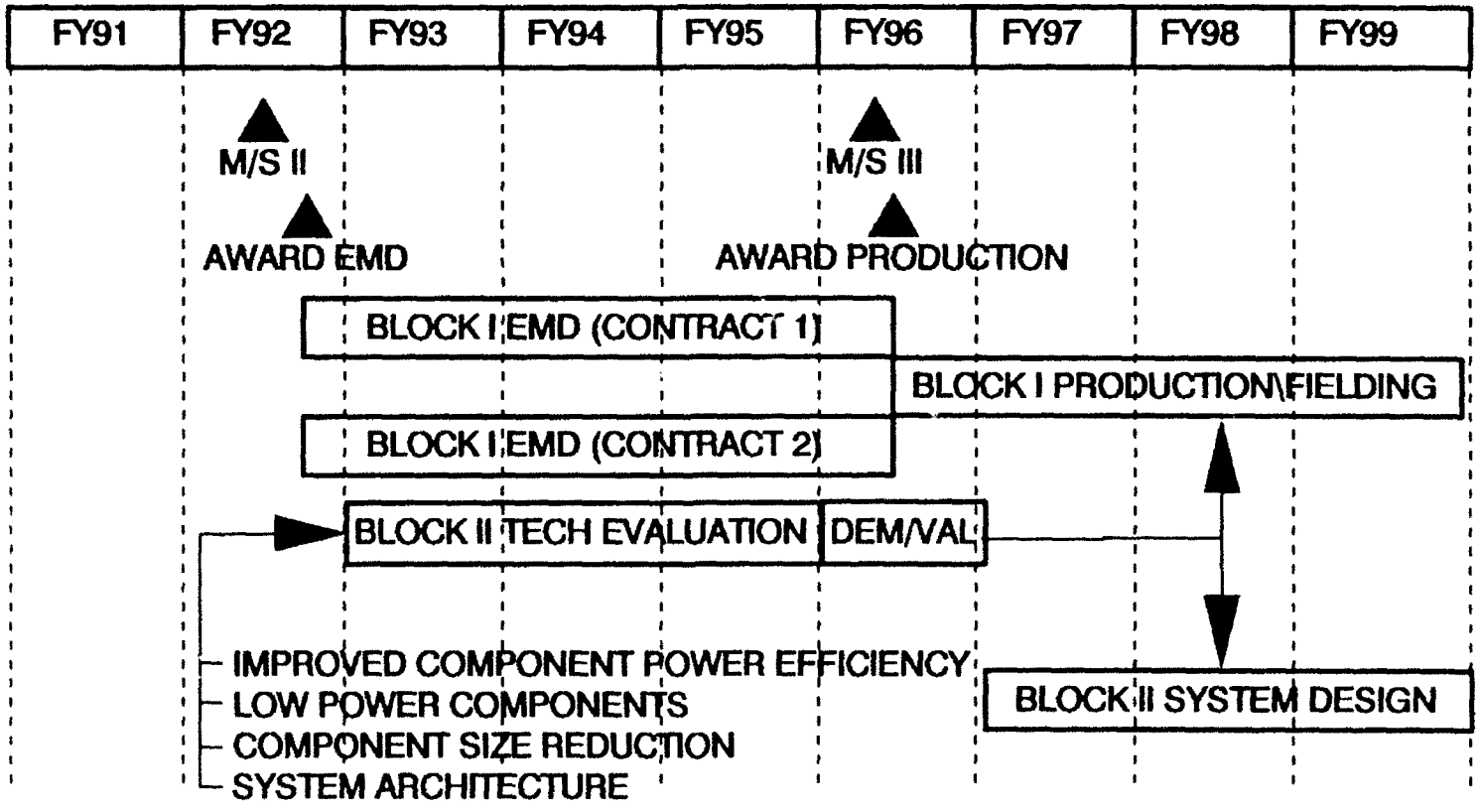
SYSTEM ACQUISITION AND TECHNOLOGY INSERTION

- BLOCK I - EMD & PRODUCTION
- BLOCK II - DEMONSTRATION & VALIDATION

REQUIREMENTS	BLOCK I	BLOCK II
Total Weight	< 30 lbs	12-15 lbs
Operating Time	12 hrs	24 hrs (required) 96 hrs (objective)
Setup/Teardown Time	10 minutes	5 minutes (objective)
MTBOMF	1200 hrs	1250-3000 hrs
IOC	FY98	1QFY02
Total Production Units	456	2549

SINGLE CHANNEL ANTI-JAM MANPORTABLE (SCAMP) TERMINAL

BLOCK I/II PROGRAM SCHEDULE



JOINT ADVANCED SPECIAL OPERATIONS RADIO SYSTEM (JASORS)

RESEARCH, DEVELOPMENT & ACQUISITION PROGRAM

- SYSTEM CONCEPT EXPLORATION & DEFINITION

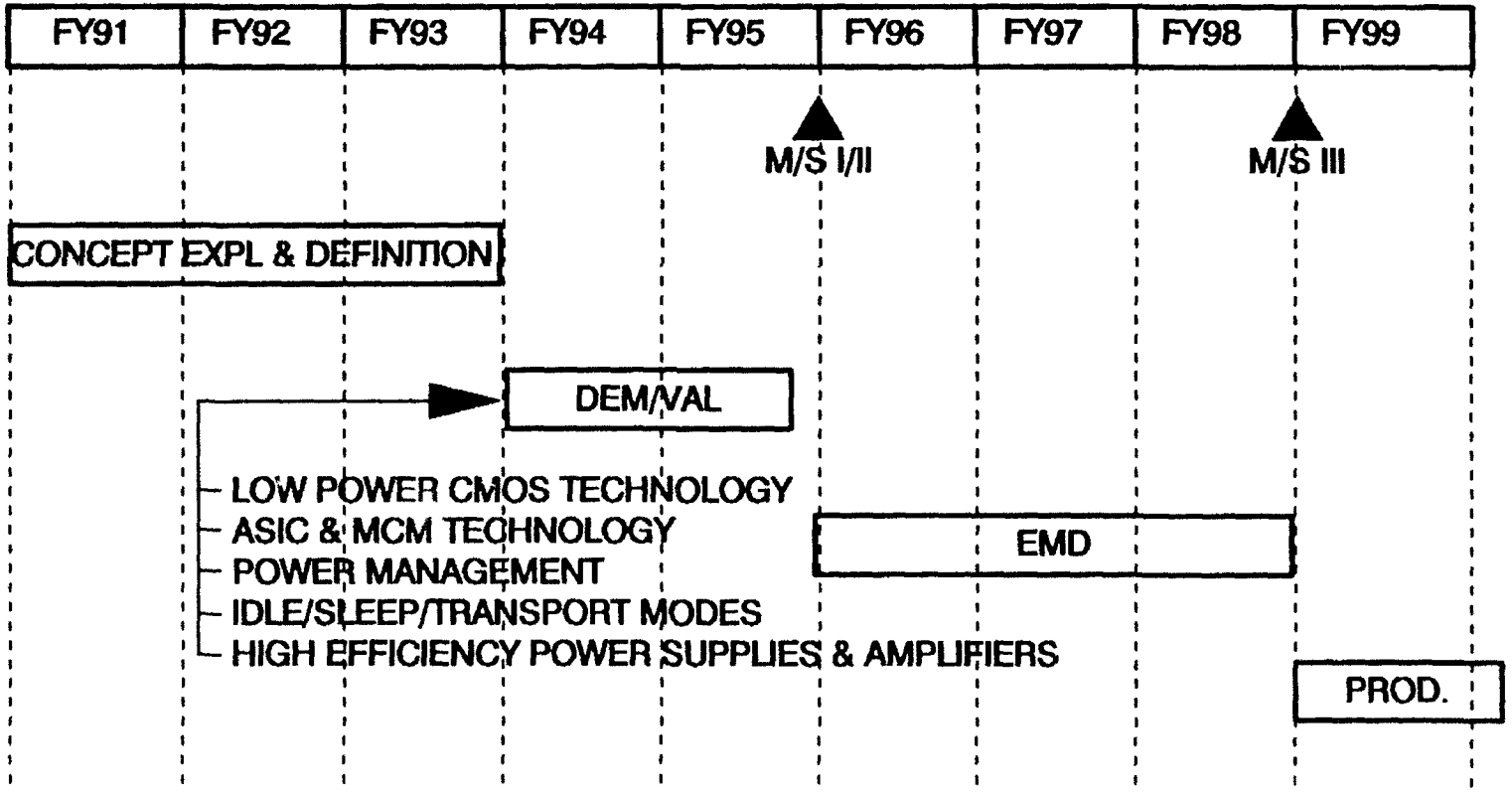
  Team Digital Message Entry Device (DMED)
  Manpack Radio (MPR)
  Interteam Radio (ITR)
  Transportable Base Station (TBS)
  Integrable Base Station (IBS)

- REQUIREMENTS

	DMED	MPR	ITR
Total Size (inches)	4 x 6 x 2	3 x 7.25 x 11.2	3 x 10 x 1.5
Total Weight (pounds)	< 2	< 10.5	< 4
Operating Modes			
Operational		6-1 min. trans/day	
Transportable		45 days	
Cache		180 days	
Principle Electric Power Source - BA-5590/BB-590			

JOINT ADVANCED SPECIAL OPERATIONS RADIO SYSTEM (JASORS)

PROGRAM PLAN



INTEROPERABLE POWER ADAPTER & CHARGER (IPAC)

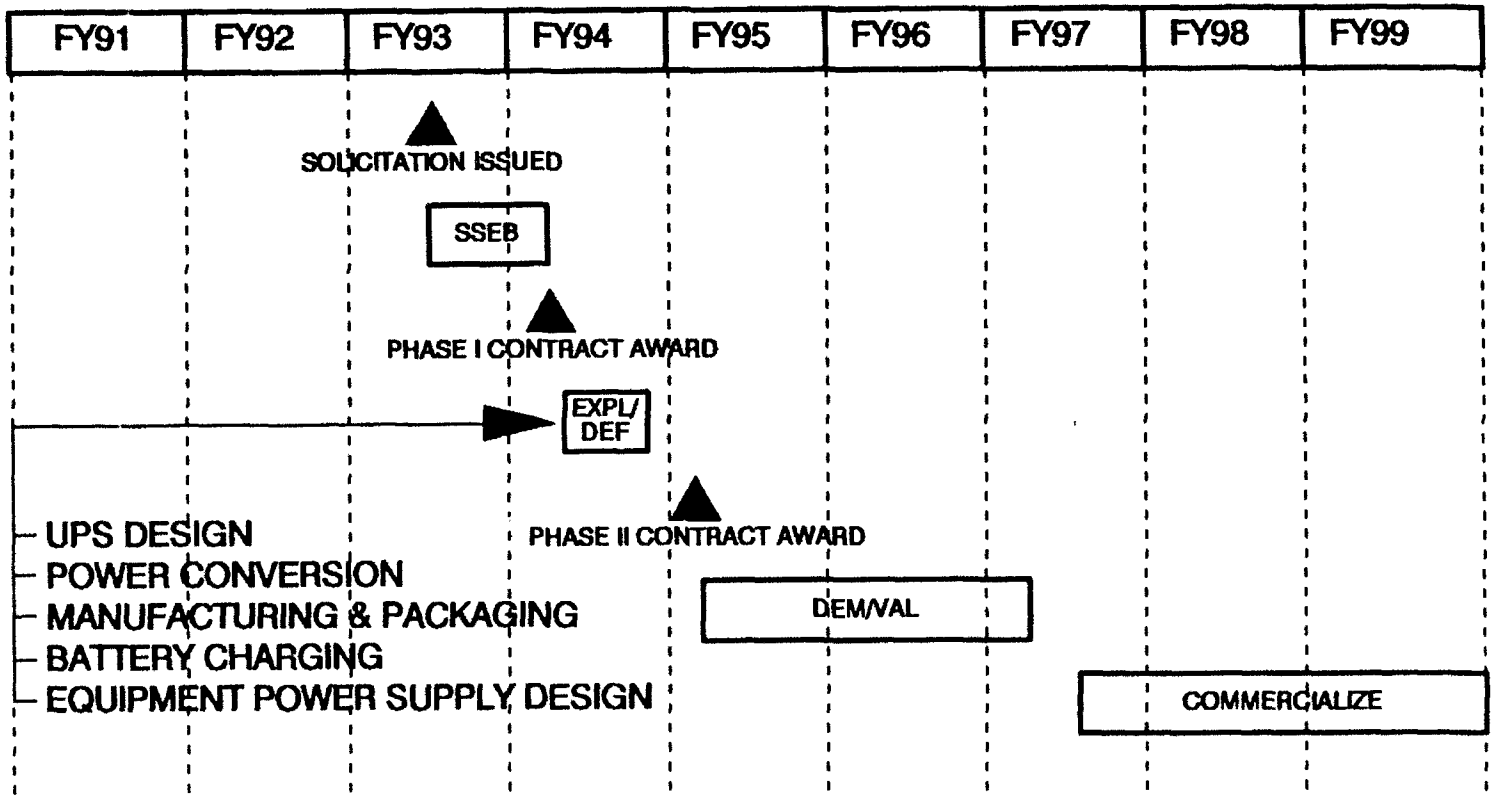
SMALL BUSINESS INNOVATIVE RESEARCH PROGRAM

CONCEPT EXPLORATION & DEFINITION

- Manportable, safe, survivable & efficient power supply design for use in tactical environments
- Interoperable with tactical electric power sources & secondary battery chemistries
- Horizontal integration with manportable C4I equipment
- Investigate power conversion, conditioning & charging technology; manufacturing & packaging techniques; and alternative power supply designs & methods

INTEROPERABLE POWER ADAPTER & CHARGER (IPAC)

PROGRAM PLAN



END ITEM EQUIPMENT DESIGN REQUIREMENTS

SUMMARY

- C4I EQUIPMENT DESIGNS ARE INFLUENCED AND CONSTRAINED BY OPERATIONAL REQUIREMENTS
- LOW POWER & ENERGY EFFICIENT DESIGN TECHNOLOGY MUST BE CONSIDERED PRIOR TO TRANSFER TO PRODUCT APPLICATIONS
- POWER SYSTEM DESIGNS NEED TO BE ADEQUATELY ADDRESSED IN REQUIREMENT & ACQUISITION DOCUMENTS AND AT ALL MILESTONE REVIEWS

NOTES

POWER SOURCES STATEMENT OF WORK

Mr. Richard O. Banyard
Chief, CCS/Avionics Division
Product Integrity and Production Engineering

UNCLASSIFIED

POWER SOURCES SOW
PROBLEM

HIGH POWER DEMAND → EXPENSIVE BATTERIES

HIGH ENERGY CONSUMPTION → SHORT BATTERY LIFE

LARGE AMOUNT OF UNIQUE BATTERIES → USER NEED MANY BATTERY TYPES

ARMY CANNOT AFFORD

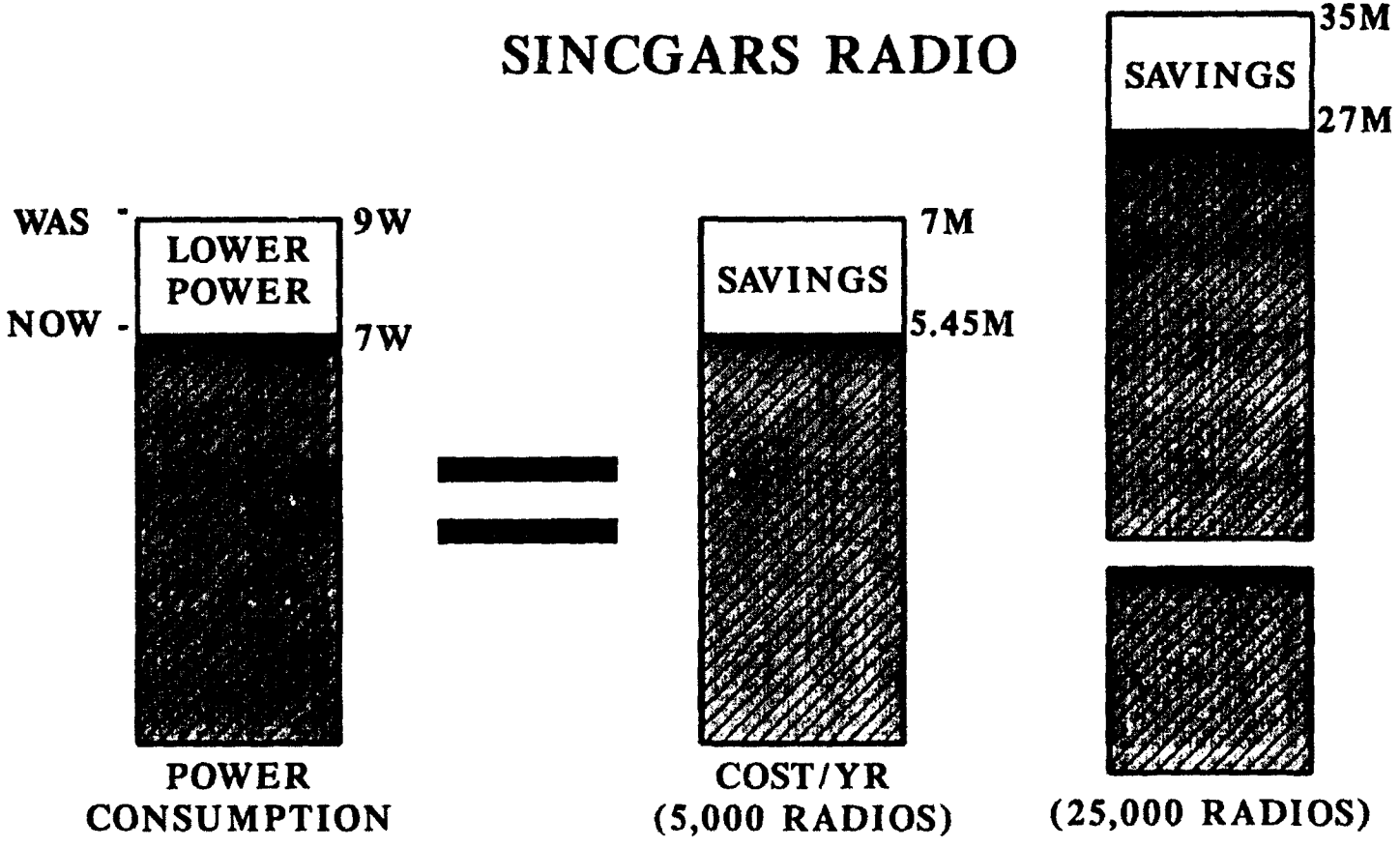
POWER SOURCES SOW

GOAL

DRIVE DESIGNS TO USE

- LESS POWER
- STANDARD BATTERIES

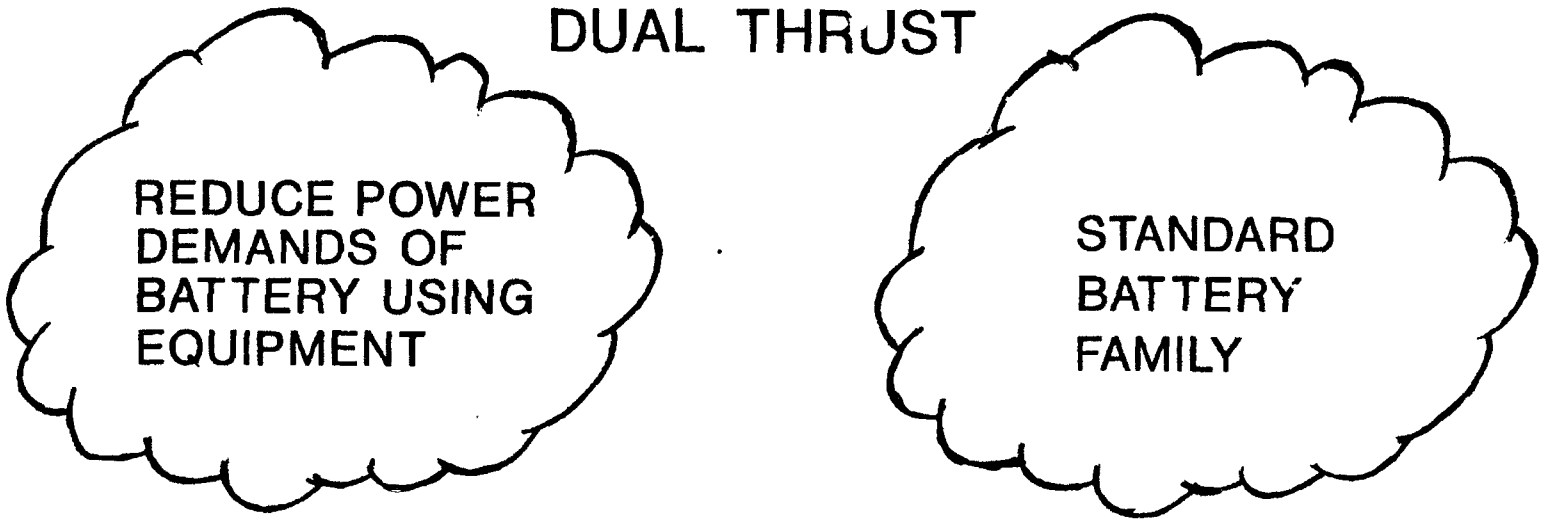
POWER SOURCES SOW EXAMPLE



POWER SOURCES SOW

SOLUTION

DUAL THRUST



POWER SOURCES SOW
REDUCE POWER DEMAND

NEW DESIGNS

SOURCE SELECTION: BATTERY LIFE CYCLE COSTS A SELECTION FACTOR.

CONTRACT EXECUTION: PROPOSAL DETAILS BECOME A CONTRACT REQUIREMENT

CURRENT DESIGNS

CONTRACTOR: VECP COLLATERAL SAVINGS

GOVERNMENT: PRODUCT IMPROVEMENT PROGRAMS

POWER SOURCES SOW

STANDARD POWER SOURCES

SELECT FROM:

STANDARD CONSUMER BATTERIES

-OR-

FAMILY OF STANDARD MILITARY BATTERIES

SELECTIONS SUBJECT TO ARMY APPROVAL

POWER SOURCES SOW
PAYOFFS

- FEWER BATTERY TYPES - PARTICULARLY ON THE BATTLEFIELD
- LESS BATTERIES USED - EXTENDED MISSION TIME
- COMMERCIAL BATTERY INDUSTRIAL BASE

POWER SOURCES SOW
BOTTOM LINE

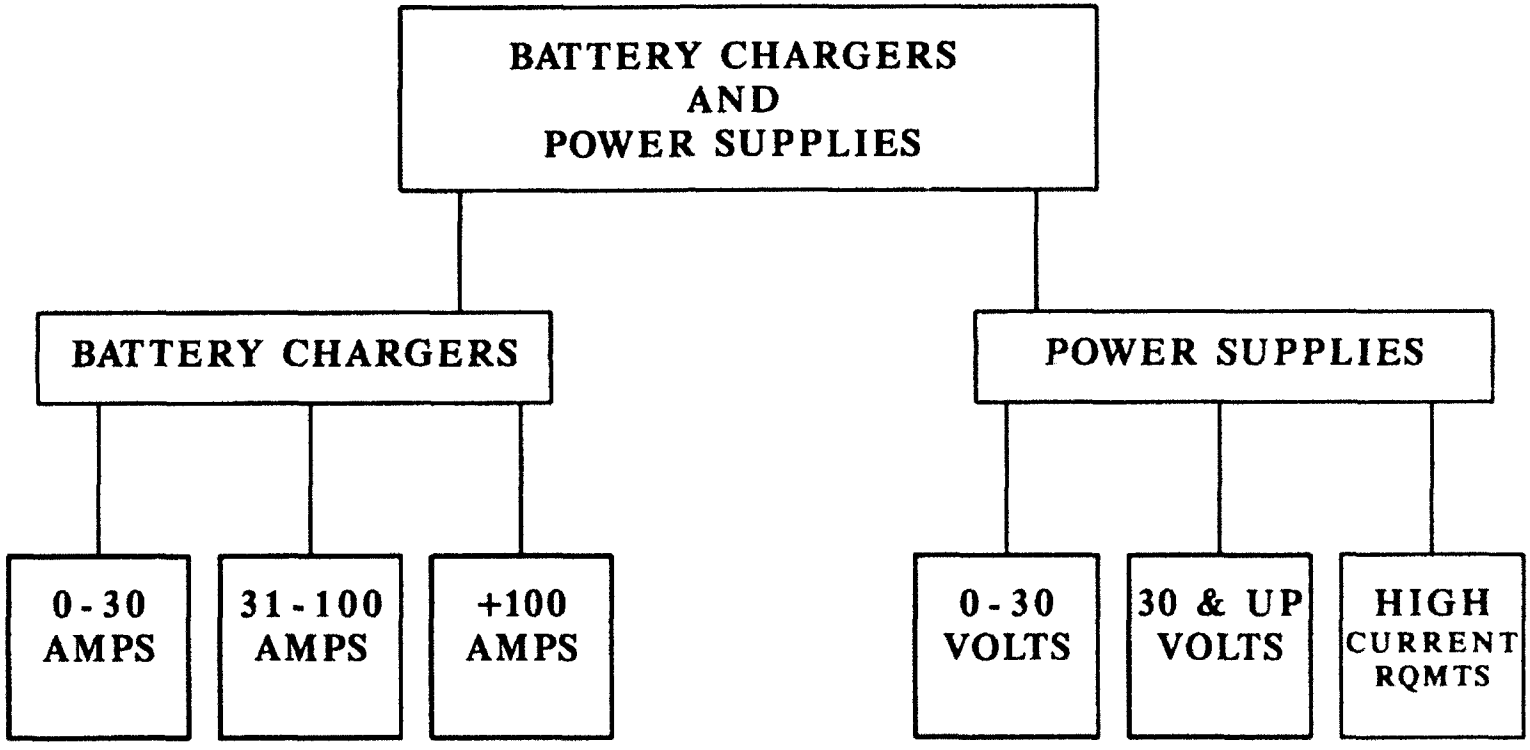
ARMY IS SERIOUS ABOUT:

- DESIGNING FOR LOWER POWER
- SPENDING LESS ON BATTERIES

THE ARMY MUST LIVE WITHIN ITS MEANS

POWER SOURCES MODERNIZATION

APPROACH



REDUCE 17 ITEMS TO AS FEW AS 6

NOTES

SESSION IV

BUSINESS OPPORTUNITIES

APBI LEVEL II

BUSINESS OPPORTUNITIES

DR. JOSEPH M. BUCCIERI

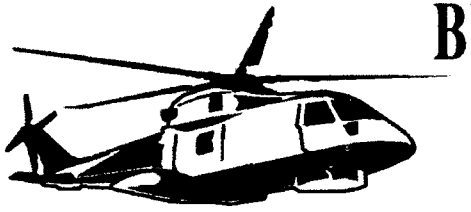
C3I ACQUISITION CENTER

AGENDA

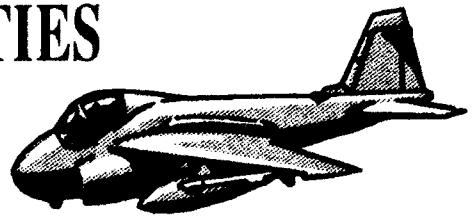
- BASIC FORMATS
- INDIVIDUAL CONTRACT OPPORTUNITIES
- ELECTRONIC BULLETIN BOARD
- UNSOLICITED PROPOSALS
- COST REDUCTION OPPORTUNITIES

BUSINESS OPPORTUNITIES
BASIC FORMATS

- SEALED BID
  - USE OF HARDWARE SAMPLES
  - LONG TERM CONTRACT (2-5 YRS)
  - EXAMPLES:
    - LITHIUM S02
    - UNIQUE BATTERY TYPES
- FORMAL S0URCE SELECTION
  - BEST VALUE
  - AWARD FEE
  - USE OF HARDWARE SAMPLES
  - LONG TERM CONTRACT (2-5 YRS)
  - TYPE CONTRACTS INDEFINITE DELIVERY
  - EXAMPLES:
    - OBJECTIVE PRIMARY
    - INTERIM AND OBJECTIVE RECHARGEABLE



BUSINESS OPPORTUNITIES



CONTRACT OPPORTUNITY: AIRCRAFT BATTERIES
FIVE DIFFERENT BATTERIES
SIX DIFFERENT CELLS

CONTRACT METHOD: SEALED BID

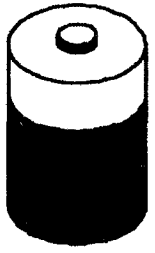
QUANTITIES: BATTERIES: 2,730
CELLS: 118,000

SCHEDULE: SOLICITATION DATE: AUG 93
AWARD DATE: DEC 93

ESTIMATED VALUE: BASIC - $5.9M
100% OPTION FOR 2 YEARS

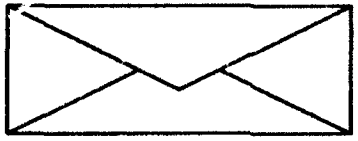
POC: ROBERT REAGAN
C3I ACQUISITION CENTER
908-532-5645

BUSINESS OPPORTUNITIES CON'T



CONTRACT OPPORTUNITY: LITHIUM THIONYL CHLORIDE BATTERY BA-6516

CONTRACT METHOD: SEALED BID WITH SAMPLES



		MINIMUM	MAXIMUM
QUANTITIES:	YR 1	500	4,500
	YR 2 (OPT)	-0-	9,000
	YR 3 (OPT)	-0-	9,000

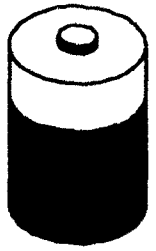
SCHEDULE: SOLICITATION ISSUE DATE: JUL 93
AWARD DATE: NOV 93

ESTIMATED VALUE: $75K $675K

POC: ROBERT REAGAN
C3I ACQUISITION CENTER
908-532-5645

BUSINESS OPPORTUNITIES CON'T

CONTRACT OPPORTUNITY: LITHIUM MANGANESE DIOXIDE BATTERY BA-5372



CONTRACT METHOD: SEALED BID WITH BID SAMPLES

		MINIMUM	MAXIMUM
QUANTITIES:	BASE	435,000	960,000
	OPT 1	220,000	495,000
	OPT 2	220,000	495,000

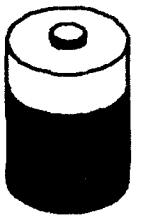
SCHEDULE: SOLICITATION DATE: JUN 93
AWARD DATE: SEP 93

ESTIMATED VALUE: $4.3M $9.7M

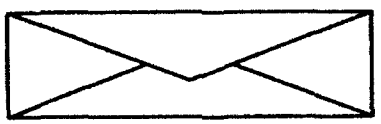
POC: ROBERT REAGAN
C3I ACQUISITION CENTER
908-532-5645

BUSINESS OPPORTUNITIES CON'T

CONTRACT OPPORTUNITY: LITHIUM SULFUR DIOXIDE BATTERIES BA-5588, BA-5599, BA-5557, BA-5598, BA-5800, BA-5112



CONTRACT METHOD: SEALED BID WITH SAMPLES



		MINIMUM	MAXIMUM
QUANTITIES:	BA-5588	250,000	730,000
	BA-5599	5,000	14,000
	BA-5557	10,000	27,000
	BA-5598	-0-	27,000
	BA-5800	-0-	248,000
	BA-5112	-0-	82,000

SCHEDULE: EBB SOLICITATION ISSUE DATE: JUN 93
AWARD DATE: SEP 93

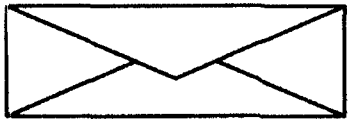
ESTIMATED VALUE: $8.5M $32.1M

POC: STEVEN LASCELLES
C3I ACQUISITION CENTER
908-532-4433

BUSINESS OPPORTUNITIES CON'T

CONTRACT OPPORTUNITY: REPLACEMENT FOR NICAD BATTERY FAMILY (INCLUDES BATTERY, BATTERY CHARGER AND POWER SUPPLY)

CONTRACT METHOD: INDEFINITE DELIVERY CONTRACT FIVE YEARS



QUANTITIES: NOT YET DETERMINED

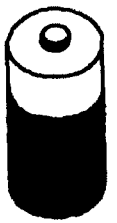
SCHEDULE: SOLICITATION DATE: AUG 93
AWARD DATE: JAN 94

ESTIMATED VALUE: $5M

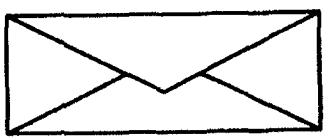
POC: ROBERT REAGAN
C3I ACQUISITION CENTER
908-532-5645

BUSINESS OPPORTUNITIES CON'T

CONTRACT OPPORTUNITY: MERCURY BATTERIES
BA-1082, BA-1085/U,
BA-1844/U



CONTRACT METHOD: SEALED BID - SBS/A



QUANTITIES: BA-1082: 1033
BA-1085/U: 4916
BA-1844/U: 1800

SCHEDULE: SOLICITATION DATE: JULY 93
AWARD DATE: OCT 93

ESTIMATED VALUE: $347K $1M

POC: ROBERT REAGAN
C3I ACQUISITION CENTER
908-532-5645

BUSINESS OPPORTUNITIES

CONTRACT BATTERY OPPORTUNTIES	SOLICITATION DATE	AWARD DATE
AIRCRAFT	AUGUST 93	DECEMBER 93
LITHIUM THIONYL CHLORIDE	JULY 93	NOVEMBER 93
LITHIUM MAGNESIUM DIOXIDE	JUNE 93	SEPTEMBER 93
LITHIUM SULFUR DIOXIDE	JUNE 93	SEPTEMBER 93
REPLACEMENT NICAD	AUGUST 93	JANUARY 94
MERCURY	JULY 93	OCTOBER 93

BUSINESS OPPORTUNITIES

SBIRs

- FY93
  - POLYMER ELECTROLYTES FOR BATTERIES (ARL)
  - POLYMER ELCTROLYTE MEMBRANES FOR FUEL CELLS AND BATTERIES (ARL)
  - INTEROPERABLE POWER ADAPTER AND CHARGER (CECOM RDEC)
- FY94
  - POLYMER ELECTROLYTES FOR BATTERIES (ARL)
  - METHANOL FUEL CELL ELECTROLYTES AND MODULES (ARL)

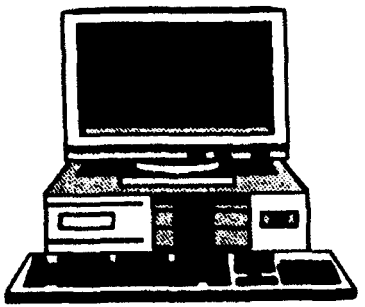
BUSINESS OPPORTUNITIES

ARL - BAAs

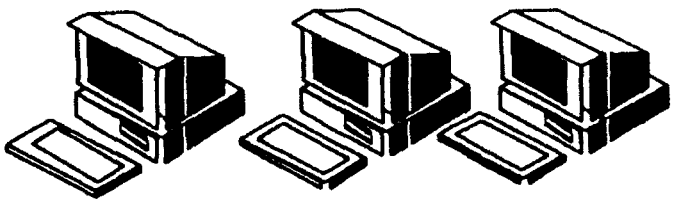
- FY93
  - HIGH POWER NONRECHARGEABLE BATTERY HYDROGEN FUEL CELL
  - LITHIUM ION, BB-X590
  - RECHARGEABLE ZINC-ALKALINE
- FY94
  - LITHIUM ION FAMILY
  - SOLID OXIDE FUEL CELL
  - NICKEL METAL HYDRIDE

ELECTRONIC BULLETIN BOARD

24 HOUR ACCESS



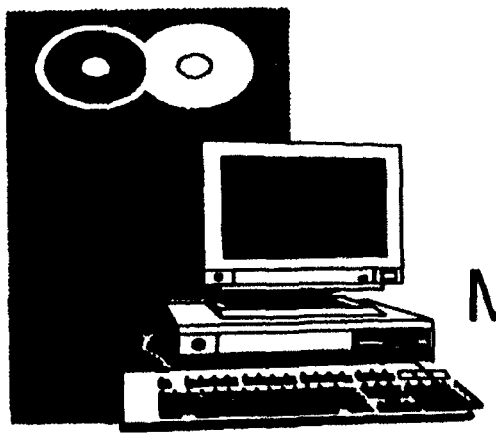
GOVERNMENT



INDUSTRY

FILES

MESSAGES

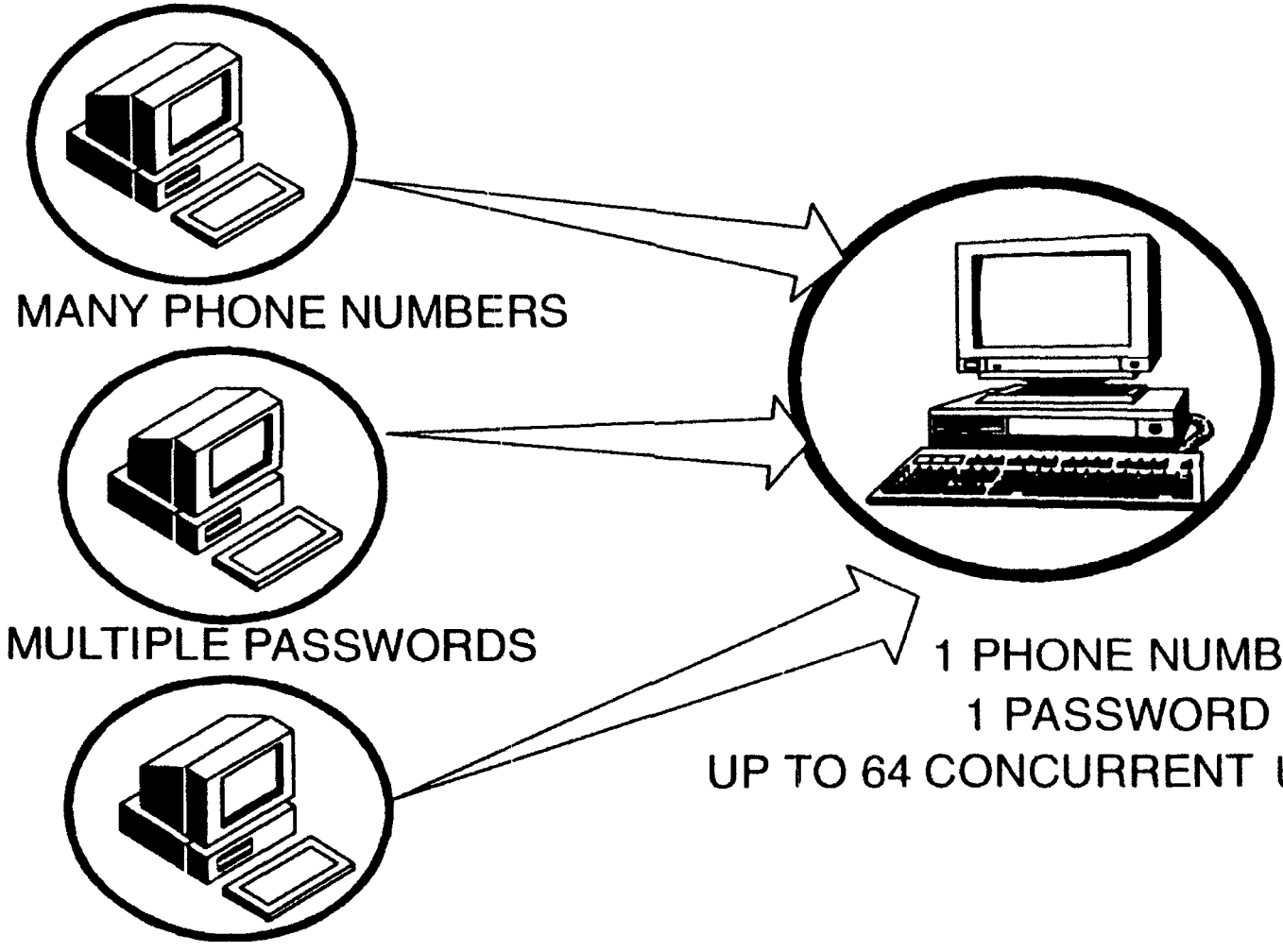


FILES

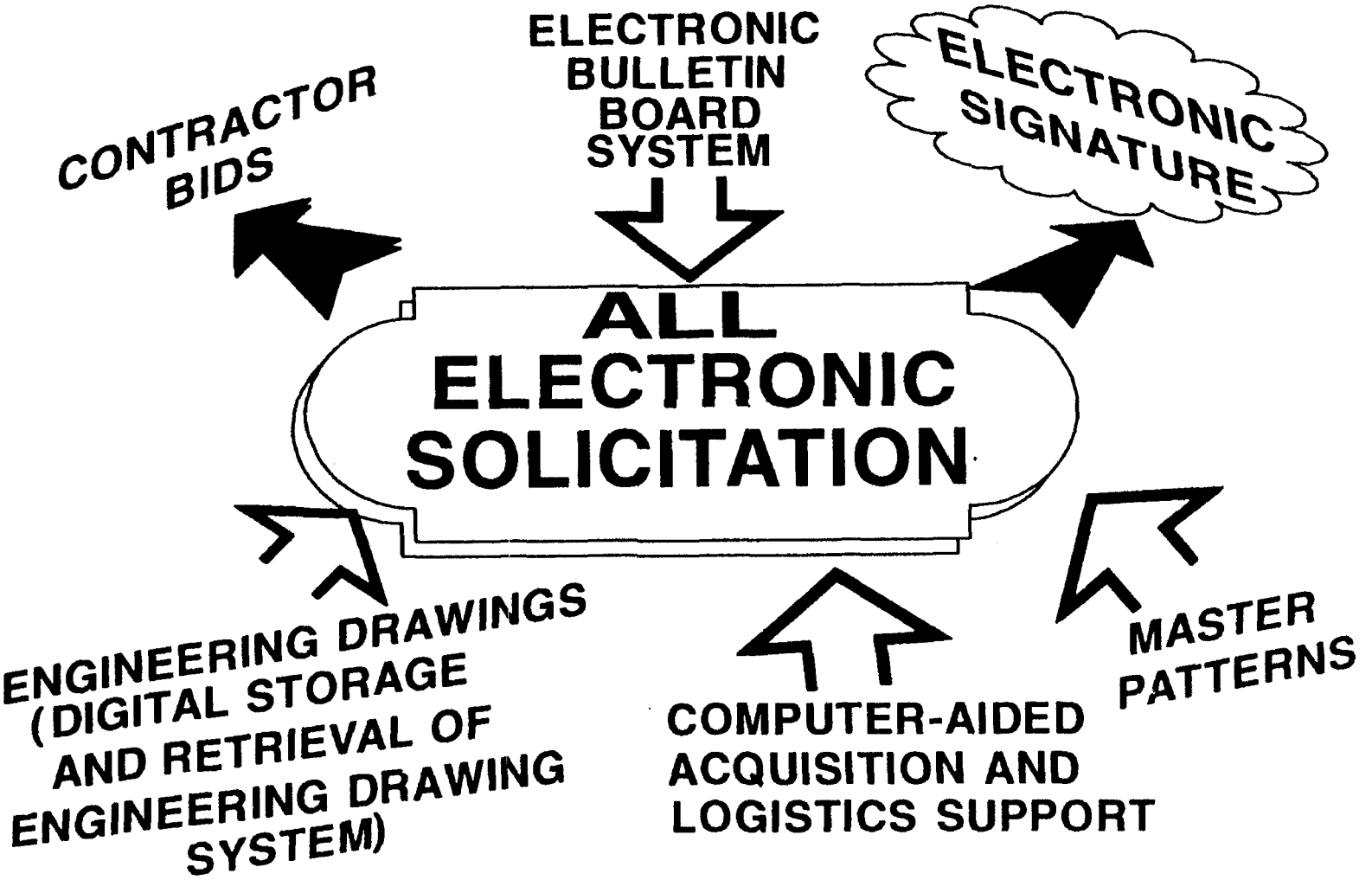
MESSAGES

ELECTRONIC BULLETIN BOARD

TODAY:
ISLANDS OF EBBS

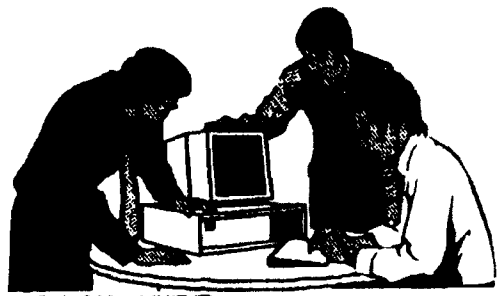


ALL ELECTRONIC PROCUREMENT PROCESS



ELECTRONIC BULLETIN BOARD/
DIGITAL PROCUREMENTS

BENEFITS

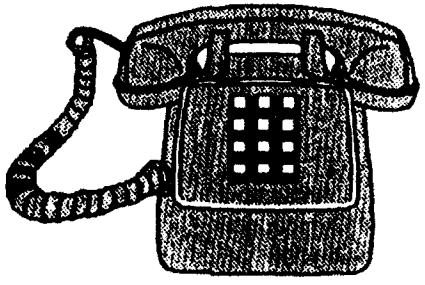


- STREAMLINES THE TRANSFER OF ELECTRONIC DATA BETWEEN GOVERNMENT AND INDUSRTY
- INFORMATION CAN BE EXTRACTED AND TRANSMITTED VIA INDUSTRY'S NETWORK TO MATRIX ORGANIZATIONS AND SUBCONTRACTORS
- ENHANCED SOLICITATION CLARITY AND QUALITY
- REDUCED PROPOSAL PREPARATION THROUGH INDUSTRY'S EARLY INVOLVEMENT
- ALLOWS MULTIPLE USERS TO SIMULTANEOUSLY DOWNLOAD FILES, ACCESS E-MAIL, CDRL TRACKING AND CORRESPONDENCES
- 24 HOUR ACCESS ELIMINATES TIME-ZONE HINDRANCES

ELECTRONIC BULLETIN BOARD/ DIGITAL PROCUREMENTS

POINTS OF CONTACT

MR. DAVID FIELTSCH
(908)532-1912



MR. ROGER BERGER
(908)532-1242

UNSOLICITED PROPOSALS

UNSOLICITED PROPOSALS

ARE -

- A MEANS BY WHICH UNIQUE AND INNOVATIVE IDEAS ARE OFFERED TO THE ARMY
- INDEPENDENTLY ORIGINATED AND DEVELOPED BY OFFEROR
- PREPARED WITHOUT GOVERNMENT SUPERVISION

UNSOLICITED PROPOSALS

ARE NOT -

- CONTRIBUTIONS
- TECHNICAL CORRESPONDENCE
- ADVERTISING MATERIAL
- ADVANCED PROPOSALS FOR A KNOWN AGENCY REQUIREMENT THAT CAN BE ACQUIRED BY COMPETITIVE METHODS

GOVERNMENT EVALUATION

- CRITERIA
- UNIQUE AND INNOVATIVE METHODS, APPROACHES OR CONCEPTS
- OVERALL SCIENTIFIC, TECHNICAL OR SOCIOECONOMIC MERITS
- POTENTIAL CONTRIBUTIONS TO THE EVALUATOR'S MISSION
- SUBMITTER'S CAPABILITIES, RELATED EXPERIENCE, FACILITIES, TECHNIQUES, OR UNIQUE COMBINATIONS OF THESE WHICH ARE INTEGRAL FACTORS FOR ACHIEVING THE PROPOSAL OBJECTIVES

POINT OF CONTACT FOR

UNSOLICITED PROPOSALS

SUBMISSIONS AND QUESTIONS

CECOM USP MANAGER:

NANETTE MULLENAX

908-532-2671

OR

SANDRA VERMONT

908-532-2974

UNSOLICITED PROPOSALS

	FY91	FY92	FT93(OCT-MAR)
ON HAND	11	11	3
RECEIVED	61	37	16
REJECTIONS	51	44	13
ACCEPTED	10	1	1

BUSINESS OPPORTUNITIES
COST REDUCTION

- **VALUE ENGINEERING CHANGE PROPOSALS (VECPs)**

  POC: AL PALEY, VECP PROGRAM MGR
  (908)532-2318

- **OPERATING AND SUPPORT COST REDUCTION(OSCR)**

  POC: RICHARD SANDFORD, OSCR PROGRAM MGR
  (908)532-6815

NOTES

EXECUTIVE PANEL

Mr. Patrick J. Whitfill
Director, Systems Management
US Army Communications-Electronics Command

Dr. Robert P. Hamlen
Director, Power Sources Division
US Army Research Laboratory

Dr. Joseph Buccieri
Chief, Division B, C3I Acquisition Center
US Army Communications-Electronics Command

Mr. Richard O. Banyard
Chief, CCS/Avionics Division
Product Integrity and Production Engineering Directorate
US Army Communications-Electronics Command

CLOSING REMARKS

SUMMARY

- EMPHASIS ON REDUCING O&S COSTS
- NEXT GENERATION OF POWER SOURCES BASED ON DUAL USE TECHNOLOGY
- DEVELOP IMPROVED, COST EFFECTIVE POWER SOURCES
- INCREASED STANDARDIZATION EFFORTS
- EMPHASIZE BATTERY SELECTION AND POWER MANAGEMENT IN INITIAL END ITEM DESIGN EFFORTS
- NEED FOR INDUSTRY SOLUTIONS TO THE PROBLEMS

SYMPOSIUM
PARTICIPANTS

COL DOMENIC F. BASILE
HQ, US Army Communications-Electronics Command
AMSEL-DCB
Fort Monmouth, New Jersey 07703
(908) 532-3559

MR. PATRICK J. WHITFILL
HQ, US Army Communications-Electronics Command
Systems Management Directorate
AMSEL-LC-SM
Fort Monmouth, New Jersey 07703
(908) 532-2332

DR. ROBERT P. HAMLEN
HQ, US Army Research Laboratory
AMSRL-PD
Fort Monmouth, New Jersey 07703
(908) 544-2804

MR. JEFFREY SPANGHER
HQ, US Army Communications-Electronics Command
Systems Management Directorate
AMSEL-LC-SM-S
Fort Monmouth, New Jersey 07703
(908) 532-6115

DR. JOSEPH BUCCIERI
HQ, US Army Communications-Electronics Command
C3I Acquisition Center
AMSEL-CDD-DX
Fort Monmouth, New Jersey 07703
(908) 532-3273

MR. RICHARD O. BANYARD
HQ, US Army Communications-Electronics Command
Product Integrity and Production Engineering Directorate
AMSEL-LC-ED-G
Fort Monmouth, New Jersey 07703
(908) 532-4362

MR. CHRISTOPHER KENCIK
HQ, US Army Communications-Electronics Command
Safety Office
AMSEL-SF-RE
Fort Monmouth, New Jersey 07703
(908) 544-3112

MR. DOUGLAS A. ANTISELL
PM, Single Channel Ground and Airborne Radio System
SFAE-CM-GAR-TMD
Fort Monmouth, New Jersey 07703
(908) 544-3027

MR. PERRY HUGO
HQ, US Army Communications-Electronics Command
Research, Development and Engineering Center
AMSEL-RD-AS-TL
Fort Monmouth, New Jersey 07703
(908) 544-2022

DAN KIEFFNER
Department of the Navy
Naval Surface Warfare Center
Crane Division
Crane, Indiana 47522
(812) 854-1593

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